Economic Growth and Human Resource Development in an Islamic Perspective

Edited by
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Contents

Foreword

The papers presented at the Fourth International Islamic Economics Seminar, which focused on "Economic Growth and Human Resource Development in an Islamic Perspective," have been reviewed, revised, edited, and published. The seminar, organized by the Association of Muslim Social Scientists (AMSS) in cooperation with the International Institute of Islamic Thought (IIIT), was held at the World Bank on *13-14 Dhū al Qa'dah 1412* / 16-17 May 1992.

This seminar was made possible by the dedication and hard work of Zaidi Sattar, who served as its program chair. His persistent follow-up with presenters, reviewers, and facilitators was indeed admirable. On behalf of the AMSS, I would like to express our appreciation to Zaidi Sattar.

We are also thankful to Sultan Ahmad of the World Bank, who functioned as co-chair of the seminar and helped his colleagues from the International Monetary Fund (IMF) and the World Bank to participate in the presentations and discussions. Ehsan Ahmad is to be appreciated for taking up the responsibility of getting the papers reviewed and revised. Jay Willoughby, managing editor of the quarterly *American Journal of Islamic Social Sciences* (AJISS), a joint IIIT-AMSS publication, worked very hard to copy edit and desktop the volume so that it could be released at the Fifth International Islamic Economics Seminar, which will be held in Washington, DC, on *22-23 Rabī' al Ākhirah 1414* / 9-10 October 1993. It was the dedication of these people that has allowed us to publish these proceedings promptly.

The funding for the Seminar was provided by IIIT. The Islamic Development Bank (IDB), the international bank of Muslim countries based in Jeddah, Saudi Arabia, sponsored some of the overseas participants. The AMSS is indebted to these Muslim institutions for their commitment, support, and encouragement.

The proceedings of the seminar have come to be regarded as a valuable contribution to the literature that is developing on the discipline of Islamic economics, and AMSS is thankful to Almighty Allah for providing it the opportunity to play such an important role in the growth of this branch of knowledge.

Sayyid Muhammad Syeed
General Secretary
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Preface

As most economists would agree, the major goal of economic development is to benefit humanity. However economic development without any moral, ethical, and social values will only enhance the process of material well-being without any true sense of direction. Economic development without human resource development is a difficult process, but human resource development without any regard for fundamental moral values is a process without any true substance. The theme of the Fourth International Islamic Economics seminar dealt with these aspects of economic development. The seminar, entitled "Economic Growth and Human Resource Development in an Islamic Perspective," was held during May 1992 and was a joint undertaking of the Association of Muslim Social Scientists (AMSS) and the International Institute of Islamic Thought (IIIT).

It is my pleasure to present this volume based on eight papers selected after a confidential peer review of all papers submitted or presented at the conference. The first four papers are theoretical and cover different aspects of human resource development from an Islamic perspective, whereas the last four papers discuss empirical ev-dence from some select Muslim countries. The first paper, entitled "Terms of Trade, Income Distribution, and Human Resource Development Under Profit Sharing," by Jamal Abu-Rashed, develops a two-sector, two-factor general equilibrium model of a small country. Although the paper utilizes neoclassical techniques, it goes beyond these assumptions by introducing uncertainty within the profit-sharing environment. The process of development in Abu-Rashed's paper can be applied to many Muslim economies.

The next paper is by Masudul Alam Choudhury. The main these of his "A Mathematical Formulation of the Knowledge-Based Worldview of Development" is that an Islamic approach to development theory differs substantially from the pluristic approaches of mainstream economics. Choudhury's paper is followed by Jamshed Uppal's "Investment in Human Capital Financed by Profit and Loss Sharing Contracts." Uppal's paper analyzes the question of investment levels in human capital in an economy where financing is based not on interest-bearing credit but on profit-and-loss sharing arrangements. He treats the question of human resource development as a capital budgeting problem by a profit maximizing firm. The behavior of investment under an Islamic interest-free system is also influenced by changes in the time and risk preferences of investors, qualitative changes in the contracting behavior, the lowering of moral hazards, and the increase in expected returns. The last theoretical paper, "Firm-Level Decisions and Human Resource Development in

Islamic Economy," is by Abdul Aziz. This detailed paper discusses the principles and techniques of human resource development. Its main thesis is that the guidelines for human resource development are given by the Qur'an and the hadith. The western capitalistic systems have been trying to adopt these guidelines by trial and error.

The next four papers bring an empirical perspective to human resource development in Islamic perspective. In his paper entitled "Human Resource Development in the Context of Some Resource-Rich, Education-Poor and Resource-Poor, Education-Rich Developing Countries," Ataul Haq Pramanik points out that human capital development through education, whether formal or informal, is a fundamental requirement for sustainable economic development. Economic development without moral, ethical, and spiritual development, he asserts, enhances human distress and weakens the social fabric. Empirical studies of Sri Lanka, Malaysia, Bangladesh, and South Korea are used to support these conclusions. The next paper, "Human Resource Development in a Poor-Capital Islamic Economy: The Case of Sudan," is an examination, by Oman Suliman, of a production function possessing the characteristics of a poorly trained labor force, which was estimated empirically by using data on the Sudanese economy. The results support the notion of the weak disposability of labor. The paper offers some insights on how to improve human capital in Muslim countries. Suliman's paper is followed by that of Bander al Hajjar, John S. Presley and J. W. Wright, Jr. Entitled "Structural and Attitudinal Impediments to Effective Capital Distribution in Saudi Arabia's Islamicizing Economy: Implications for Financial Sector Training," it points out the absence of trained businessmen and bankers in the economy. This problem is exacerbated by the fact that consistent accounting procedures are not used in bank dealings. The paper considers the non-availability of trained personnel as the most striking problem in many developing countries, including capital-rich Saudi Arabia.

The last paper in the volume, "Human Capital, Government Policies, and Economic Growth: Some Evidence for Muslim Countries," is Abdelhameed Bashir and Ali Darrat. Emphasizing a theory of endogenous growth, they use both endogenous reproducible factors and market-related growth variables for their empirical study. The study shows very diverse rate of growth in thirty-two Muslim (OIC members) countries. This diversity in growth rates is explained primarily by the initial level of per capital real GDP and the available stock of human capital. Moreover, they find a negative relationship between government fiscal policy and economic growth across countries.

This volume would not be complete without an acknowledgment of the hard work done by Zaidi Sattar, who chaired the program committee of this conference. I must also acknowledge the efforts of Sultan Ahmad, who gave his valuable time to put this conference together, and the continuous advice and encouragement from Sayyid M. Syeed of IIIT to prepare this volume. It has been a real pleasure to work with these three gentlemen. I must also recognize the authors who presented their papers in the conference but who were not included in this volume due to the limited

amount of available space. Finally, my compliments go to highly professional group of economists who found the time to review the papers presented in the conference. My hope is that everybody involved in this conference will continue to play an active role in expansion of the field of Islamic economics.

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Introduction

From the seventeenth century onwards, western civilization has overspread the world, inundating the thought and culture of nonwestern peoples with its own. While doing so, moreover, it claimed that its thought and culture were universal, when in fact they were self-centered and inimical towards the "Other." The universal nature of Islam, however, is such that it is capable of accommodating the civilizations of all people. But, according to the West, "knowledge has no religion or homeland," and "knowledge is for the sake of knowledge, and art is for the sake of art." By means of these attitudes, the West hoped that the "Other" would abandon its thought and culture and join with the West and its supposed universalism.

In order to legitimize its claim, the West attempted to portray everything that differed with its ideas and values as perverse, backward, and abnormal. In fact, its universalism was never anything more than an attempt to recast the rest of the world in its own image. Then, by imposing its own culture and thought on the peoples of the world, it would be a simple matter to impose its rule and political ascendancy.

Even so, it cannot be denied that today the western mind is itself revising its position toward the "Other." But the fact remains that whatever criticism is directed at it from within is most often myopic in nature, as its perspective is formed by the thought it seeks to rectify. Thus while it is important that Muslim scholars take note of attempts by westerners to criticize their own intellectual tradition, Muslims should realize that these attempts will never lead to the revitalization of other paradigms. This is why Muslims need to develop alternatives. But this is also a universal need. Alternatives based on the oneness of the Creator and the creation and capable of restoring the balance between values and knowledge by means of situating revelation in its rightful place as an epistemological source must be devised by Muslims. If Muslims are unable to meet this challenge, it is quite possible that humanity will continue to wander in the gloom of secularized western thought.

> And We shall confuse their hearts and their eyes, even as they refused to believe in the first instance: We shall leave them to their trespasses, to wander in distraction. (Qur'an 6:110)

The Islamization of Knowledge is not a difference over Muslim and western viewpoints on certain academic issues in the social sciences, economics, and the humanities, nor is it a merely cosmetic supplementation of the disciplines with a few

well-placed references to the texts of the Qur'an and the Sunnah. On the contrary, it is a recasting of methodology and intellect in which revelation represents the fundamental source for all principles and theses. As such, then, there is no validity to the apprehension that the Islamization of Knowledge is an attempt to force religious authority on academic freedom. Nor is it an attempt to throw a figurative cloak of Islam over the academic accomplishments of others or to transform the disciplines into vehicles for fiqh and *fatāwā*. It is, in fact, an expression of a pioneering Islamic attempt to deliver Islamic thought from its present preoccupation with apologistic and comparative studies so that it can attain a new level of participation in the civilizational crisis that now encompasses humanity.

The difficulty outlined earlier is one having to do with an epistemological paradigm that cannot be separated from the system of civilization under which it is nourished and for which it speaks. As the western system is essentially divisive and stands on the struggle between opposing forces, its paradigm of knowledge is based on diametrics and dialectics that are incomprehensible without reference to the circumstances of western civilization itself. It is for this reason that we must learn to distinguish between the two.

The science of economics, especially those aspects most concerned with development, is among the most important sciences for Muslim scholars and the Muslim world today, for it deals with human and natural resources as well as with such fundamental concepts as wealth, distribution, investment, development, and self-sufficiency. Moreover, it has become clear that economic concepts and experiences from particular historical models cannot be applied in situations characterized by different circumstances and be expected to be successful.

It would be a great mistake, therefore, to blindly follow the model of western development—industrial revolution, capitalism, and technology—or to prefer that model over any of the alternative theories for development that have been proposed in contemporary circles. However, before an Islamic theory of economic development can be produced, a paradigm of Islamic economics capable of formulating Islamic concepts and theories of economics for the establishment of a just economic society, must be formulated.

In this undertaking, we must remember that priority must be given to solving immediate problems, such as those related to food production and distribution. Other problems requiring immediate attention is that of the western monopoly on technology and the brain drain. The transfer of technology cannot be allowed to continue in the form of moving operations, which are still under western control, to the Third World in order to take advantage of cheap labor. As technology is the product of the society that created it and, as such, reflects much of its culture and social values, there is a clear need for the development of technology appropriate to the circumstances of the Muslim world.

Finally, economic means are among the most significant means that humanity may employ in its role as the Earth's steward (*istikhlāf*) and the crown of creation. In using them, humanity must heed the teachings of Islam in regard to nature and the environment. In addition, production and consumption priorities must be established in a way that allows them to meet the needs of individuals and society and to be in accord with the realities of available resources and means of production.

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Terms of Trade, Income Distribution, and Human Resource Development under a Profit-Sharing Scheme

by
Jamal Abu-Rashed

Introduction

Conventional literature in international trade models assumes that producers possess perfect knowledge of all the relevant data. Bhagwati and Strinivasan (1983), Batra (1973), and Kemp (1969), among others, have discussed these issues. In reality, however, all economic activity is accompanied by uncertainty. International trade is no exception, for agents often have to make decisions without knowing the exact value of such specific crucial variables as, for example, the terms of trade.

Primary-product exporting countries are usually less-developed nations that face uncertainty about their terms of trade either because of past volatility in world prices for their exportables or because of the nature of the goods they export, while at the same time they import industrial goods at a relatively steady price. Therefore, the case in which randomness in the price of exportable goods is a more realistic one vis-à-vis the current regimes of international trade, where most Islamic countries find themselves in a deteriorating position of exporting their primary outputs at unstable, fluctuating, and hence uncertain prices. Frequently, central planners who formulate the country's commercial policies seek to maintain certain export targets before acquiring knowledge of the actual world prices, either in order to overcome a critical foreign exchange shortage or to import capital goods for investment purposes. As a result of this policy, producers have no choice but to make their input-output decisions before obtaining the knowledge of the actual price of their exportable goods.

This paper develops a general equilibrium two-sector two-factor trade model under uncertainty within the profit-sharing environment. In this spirit, we assume a small economy where two goods are produced by the help of two production factors: mainly capital and labor. The producer's goal is to maximize the expected utility of profit. Capital borrowing is based on the profit-sharing scheme. The uncertainty in

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the model is due to the uncertainty about the terms of trade as well as of exchange rates[1]. This model is utilized to study the impact of uncertainty about the terms of trade on resource mobilization, income distribution, and the national income within the context of a profit-sharing contract.

The Model

Unless otherwise specified, the following assumptions, with the exception of the modifications caused by introducing uncertainty into the model, will be maintained throughout this paper. The general framework is the usual two-country, two-sector, and two-factor model of international trade.[2]

(a) There are two traded goods, M and A, both of which are produced and consumed domestically. Furthermore, good M is exported and good A is imported. A and M represent the respective sectors as well as the levels of output.

(b) During the production process, each good requires two primary factors of production: capital K and labor L. The production functions are linearly homogeneous and concave.[3]

(c) Each good utilizes the capital-labor ratio, and the intercommodity capital-intensity relation is nonreversible.[4]

(d) Factors are perfectly mobile between the two sectors in the long run and are fully employed, i.e., there is perfect competition in all markets, so that all producers are price takers. However, this assumption with regard to sector M implies that at the time of the input-output decision-making process, M producers are uncertain about the price of M, i.e., they have no influence in the determination of the subjective distribution of M's price. In other words, M producers are

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[1]Unlike a system with a fixed cost of borrowing, the total user cost of capital is based on the profit-sharing ratio. As the profit rate is subject to variability in response to changes in the profit rate, investment decisions should be based on some expected profit rate. Following Sattar (1990), Anwar (1987), and Mirakhor (1986), the expected user cost of capital is given by $r = \gamma\pi$, where $0 < \gamma < 1$ is the profit-sharing ratio and π is the expected profit rate.

[2]There are several interesting issues in welfare economics that deserve comprehensive treatment but were left untouched, due to my belief that the neoclassical general equilibrium models of production are not adequate for this purpose.

[3]This assumption implies that returns to scale are constant, while returns to factor proportions are diminishing.

[4]This assumption can be stated more explicitly as follows: a commoditiy is itensive in the use of the same factor at all factor prices.

price takers in the probabilistic sense and they take the mean of the price of M as given.

(e) Producers in sector M, who have to make their input-output decisions prior to knowing the price of their output, seek to maximize the expected utility from profits.[5] In addition, sector M uses another factor: human capital (H). To simplify the analysis, we assume that this factor enters into the production function of M as an efficiency parameter; that is to say, human capital raises the productivity of labor.[6] Furthermore, all producers have the same utility function, and their attitude towards risk can be described by a risk-averse Von Neumann-Morganstern utility function.

(f) The country under study is a small Islamic country and a price taker, i.e., its actions cannot influence the probability distribution about the terms of trade.

(g) The government can collect and distribute zakat to the needy. Zakat is imposed at a fixed rate on idle capital and on the rate of return of employed capital, provided that the amount of the zakatable capital exceeds a minimum (*nisāb*).[7]

(h) Our economy is characterized by the absence of a fixed rate of return on borrowed capital, i.e., the user cost of capital is based on a profit-sharing ratio, and the profit rate is subject to variability in response to changes in the profit rate. As capital output decisions must be based on some expected profit rate, the expected user cost of capital is given by $\gamma\bar{\pi}$, where $0 < \gamma < 1$ is the profit-sharing ratio and $\bar{\pi}$ is the prevailing rate of profit in the economy. When the maximization process occurs, the sectors assume π, and hence r, to be known.[8]

Let the two production functions be specified as:

$$A = A(K_a, L_a) = a(k_a)L_a \quad (1)$$

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[5]It should be noted here that this mobility becomes significant only when producers of good M have to make input-output decisions. Once these decisions have been made, factors cannot move from one sector to another. This assumption is made because it implies that real factor rewards are the same everywhere in the long run but not necessarily in the short run.

[6]This is only a simplifying assumption, and our results are valid even under a more general production function. For an enlightening discussion of this assumption and its impact on the general equilibrium model, see Abu-Rashed and Slottje (1991).

[7]For a formal treatment of zakat, see Abu-Rashed and Belarbi (1990).

[8]Most relevant instruments for profit-sharing arrangements between an entrepreneur and a lender are *muqāradah*, *mudārabah*, and *mushārakah*. For definitions, see Sattar (1990).

$$M = M(K_m, HL_m) = Hm(\frac{k_m}{H})L_m \qquad (2)$$

where $k_i = \frac{K_i}{L_i}$ is the capital/labor ratio in the ith sector and $a(k_a)$ and $m(k_m)$ are the average product of labor in sector A and M respectively.[9]

In view of (1), the profit of sector A becomes:

$$\phi_a = P_a a(k_a)L_a - W_a L_a - (\gamma\bar{\pi})_a K_a \qquad (3)$$

where ϕ_a is sector A's profit level and W_a and $(\gamma\bar{\pi})_a$ are the factor rewards of labor and capital respectively. Let ϕ_m be the profit level in M, and U be the utility attainable from it. Since we assumed that the production and, hence, input-hiring decisions have to be made prior to the resolution of the price of M, then producers of sector M are interested in maximizing the expected utility from profits. Letting E be the expectations operator, the expected utility from profits of sector M is given by:

$$E\,[U\phi_m)] = \int_{Pm} U\,(P_m\, M - W_m L_m - (\gamma\bar{\pi})_m K_m)\; g(P_m) dP_m \qquad (4)$$

Equation (4) contains two decision variables, namely, K and L, where P_m stands for the price of M, which is a non-negative random variable with a density function $g(P_m)$ and expected value $E(P_m) = V$, and $(\gamma\bar{\pi})_m$ is the rate of the expected user cost of capital in sector M.[10]

The first order conditions for sector A are:

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[9]When the production functions are formulated in factor intensity forms, it can be shown that all marginal products depend on the capital-labor ratio. See Batra (1973).

[10]The introduction of stochastic elements only in one sector keeps the formulation from being cumbersome. If uncertainty were introduced in both sectors, the mathematical calculations would become tedious. Therefore, to keep the analysis and lengthy mathematical calculations from exceeding the level of complexity, I confined my analysis to the single random-variable model. In the context of this stochastic model, this implies that the price of good A and the expected price of good M are exogenously given to the country. However, M producers base their current input-output decisions on the given input prices and a probability distribution of P_m with a mean equal to V.

$$W_a = P_a(a(k_a)-k_a'(k_a)) \tag{5}$$

and:

$$(\gamma\bar{\pi})_a = P_a a'(k_a) \tag{6}$$

where $a(k_a)-k_a a'(k_a) = A_L$ is the marginal product of labor, $a'(k_a)$ is the marginal product of capital, and $(\gamma\bar{\pi})_a$ is the rate of expected user cost of capital in sector A. The first order conditions for Sector M are given by:

$$\frac{\delta E[U(\phi_m)]}{\delta L_m} = E[U'(\phi_m)\frac{\delta\phi_m}{\delta L_m}] = E[U'(\phi_m)(P_m M_L - W_L)] = 0 \tag{7}$$

and:

$$\frac{\delta E[U(\phi_m)]}{\delta k_m} = E[U'(\phi_m)\frac{\delta\phi_m}{\delta K_m}] = E[U'(\phi_m)(P_m M_k - (\gamma\bar{\pi})_m)] = 0 \tag{8}$$

where $U'(\phi_m)$ is the marginal utility of profit in sector M, $M_L = HM(k_m)-k_m M'(k_m)$ is the marginal product of labor, $M_k = m'$ is the marginal product of capital, and $m' = \frac{dm(k_m)}{dk_m}$. It should be noted here that the assumption of risk-aversion on the part of producers in sector M implies that their utility functions are strictly concave, that is $U'(\phi_m) > 0$ and $U''(\phi_m) < 0$.

In the capital market, for equilibrium to hold, the marginal value product of capital is equated across sectors and equals the rate of the expected cost of borrowing $\gamma\bar{\pi}$, i.e.:

$$\gamma\bar{\pi} = \frac{E[U'(\phi_m)P_m]m'(\frac{k_m}{H})}{E[U'(\phi_m)]} = P_a a'(k_a) \tag{9}$$

Labor hiring in the two sectors in determined by:[11]

$$W = \frac{E[U'(\phi_m)P_m]}{E[U'(\phi_m)]} M_L = P_a A_L \tag{10}$$

without loss of generality, we assume that $P_a = 1$ and $H = 1$ initially. In view of (7), (8), (9) and (10), let us collect the following subsystem as:

$$E[U'(\phi_m)m'(\frac{k_m}{H}) = a'(k_a)E[U'(\phi_m)] \tag{11}$$

and:

$$E[U'(\phi_m)P_m]M_L = A_L E[U'(\phi_m)] \tag{12}$$

under full employment:

$$L_a + L_m = \bar{L} \tag{13}$$

and:

$$L_a k_a + L_m k_m = \bar{K} \tag{14}$$

Finally, the profit of sector M can be written as:

$$\phi_m = L_m[P_m m(\frac{k_m}{H}) - A_L - k_m a'(k_a)] \tag{15}$$

With this last equation, the production side of our economy is complete.[12] Next we try to investigate the impact of uncertainty about the terms of trade on resource mobilization, income distribution, and national income.

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[11] It is assumed here that perfect competition prevails in both the factor and the product markets. Given this assumption, it follows that the reward of labor in equilibrium should be equal to the value of the marginal product of labor.

[12] From equation (15), with a, m, a'', and m'' depending only on k_m and k_a, then ϕ is a function of L_m, P_m, k_m, and k_a. Hence we have a determinate system of six independent equations, six unknowns, and three parameters.

Uncertainty about the Terms of Trade and Resource Mobilization

In this section, we examine the implications of a change in uncertainty about the terms of trade and, hence, the impact of a change in riskiness on resource mobilization. Since the price of exportables and, therefore, the terms of trade are the main causes of uncertainty, we need to establish a way to measure the change of uncertainty about the terms of trade.

Let M be the primary product exported by our small economy. P_m, as defined before, is the price of M. Following Rothchild and Stiglitz (1970), P_m can be defined in terms of the mean-preserving spread measure in the following way.[13] Let $\hat{P}_m$ be defined as:

$$\hat{P}_m = \lambda P_m + \delta$$

where λ and δ are shift parameters, and initially $\lambda = 1$ and $\delta = 0$. Then the increase in uncertainty can be defined as $d\lambda > 0$ along with $\frac{d\delta}{d\lambda} = -V$, where V is the expected price of M or the mean of the probability distribution of P_m.[14]

The question at this point is what will happen to resource mobilization in the entire economy if the variance of P_m changes? To answer this question, we differentiate the full employment equations (13) and (14) with respect to λ and obtain:

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[13]There is a concept more general than the mean-preserving spread, namely, that of stochastic dominance, which was introduced by Hadar and Russell (1969). At this time, comparative statics, in terms of stochastic dominance, is not well formulated. Thus we may stay with more a restrictive mean-preserving spread.

[14]It should be noted here that the variance of P_m is given by:

$$\sigma(\dot{P}_m) = \sigma(P_m)\lambda^2$$

where $\sigma(P_m)$ is the variance of P_m, and the expected value of P_m is given by:

$$E[\dot{P}_m] = \lambda E[\dot{P}_m] + \delta$$

Therefore an increase in λ above one leads to an increase in the variance in δ above zero and leads to an increase in $E[P_m]$. Thus, to maintain the original mean of Pm, a rise in λ should be accompanied by a decrease in δ by an amount such that the change (Δ) in $E[P_m] = 0$. Consequently, an increase in risk in terms of the mean-preserving spread may be defined by

$$d\lambda > 0$$

and:

$$\frac{d\delta}{d\lambda} = -E[P_m]$$

$$\frac{\delta L_a}{\delta \lambda} + \frac{\delta L_m}{\delta \lambda} = 0$$

$$\frac{\delta L_a}{\delta \lambda} = \frac{-\delta L_m}{\delta \lambda} = -[L_m \frac{\delta k_m}{\delta \lambda} + L_a \frac{\delta k_a}{\delta \lambda}] \frac{1}{k_m - k_a} \qquad (16)$$

and equations (11), (12), and (15) can be rewritten as:

$$E[U'(\phi_m)\ (\lambda P_m + \delta)]m'(\frac{k_m}{H}) = a'(k_a)E[U'(\phi_m)] \qquad (11)$$

$$E[U'(\phi_m)(\lambda P_m + \delta)]M_L = A_L E[U'(\phi_m)] \qquad (12)$$

and:

$$\phi_m = L_m[(\lambda P_m + \delta)m(\frac{k_m}{H}) - A_L - k_m a'(k_a)] \qquad (15)$$

In this subsystem, there are three equations in three variables, k_a, k_m, and λ, that differentiate these equations with respect to λ. Without essential loss of generality and assuming that $\lambda = 1$, $\delta = 0$ and $H = 1$ initially, we obtain the following system of equations:

$$\begin{matrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{matrix} \quad = \quad \begin{matrix} x_1 \\ x_2 \\ 0 \end{matrix} \qquad (17)$$

where:

$$a_{21} = E[U''(P_m A_K - \gamma \bar{\pi})^2\ (k_m + \frac{m - k_m m'}{m'})]$$

$$a_{11} = a_{12}(\frac{m - k_m m'}{m'})$$

$$Let\ (\frac{m - k_m m'}{m'}) = C$$

$a_{12} = E[CL_m U''(P_m A_k - \gamma\bar{\pi})^2 + m''U'P_m]$

$a_{22} = E[L_m U''(P_m A_k - \gamma\bar{\pi})^2 + m''U'P_m]$

$a_{13} = E[CL_m a'' (k_a - k_m) U''(P_m A_k - \gamma\bar{\pi}) + k_2 a''U']$

$a_{23} = E[L_a a'' (k_a - k_m) U''(P_m A_k - \gamma\bar{\pi}) - a''U']$

$a_{31} = (k_m - k_a)$

$a_{32} = L_m$

$a_{33} = L_a$

and: $x_2 = -E[MU''(P_m M_k - \gamma\bar{\pi}) + (M_k U')(Pm - V)]$

$$x_1 = \frac{x_2}{C}$$

The solution of (17) provides:

$$\frac{\delta k_m}{\delta \lambda} = \frac{-a''(k_a+C)\ E[U']x_2(k_m-k_a)}{D} \qquad (18)$$

$$\frac{\delta k_a}{\delta \lambda} = \frac{-m''(k_m+C)E[U'P_m]x_2(k_m-k_a)}{D} \qquad (19)$$

$$\frac{\delta L_m}{\delta \lambda} = \frac{x_2(L_m a''(k_a+C)\ E[U'] + L_a m''(k_a+C)E[U'P_m])}{D} \qquad (20)$$

where $D = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix} > 0$

under the assumption of non-increasing absolute risk aversion, with $a''<0$ and $m''<0$, the sign of $\frac{\delta L_m}{\delta \gamma}$ depends on the sign of x_2. Since M and M_k are non-random, then x_2 can be written as:

$$x_2 = -ME[U''(P_m M_k - \gamma\bar{\pi})(P_m - V)] - M_k E[U'(P_m - V)] \qquad (21)$$

However, in the general case of risk-averse behavior, it can be shown that the COV(U'(ϕ), (P_m - V)) is negative.[15] Also, in the presence of non-increasing absolute risk aversion, it can be shown easily that E [U'' (ϕ) ($P_m M_k$ - $\gamma\bar{\pi}$)] is non-negative.[16] At this point, we cannot sign x_2 without signing E [U'' (ϕ) ($P_m M_k$ - $\delta\bar{\pi}$) (P_m - V)]. Let us assume that the initial situation is one of certainty and that the price is known to be equal to V. In this case, the factor rewards are determined initially by the value of their marginal products, so that P_m = V initially, W = VH M_L, and $\gamma\bar{\pi}$ = VM_k, in this case:

$$P_m M_k - \gamma\bar{\pi} = (P_m - V) M_k$$

so that:

$$E [U'' (\phi) (P_m M_k - \gamma\bar{\pi}) - (P_m - V)] = M_k E [U'' (\phi) (P_m - V)^2]$$

is negative. Thus we conclude that if firms in sector M are risk averse and, initially, the price is known with certainty to be equal to the mean of the probability distribution, then $X_2 > 0$. Thus the sign of $\frac{dL_m}{d\lambda} < 0$. With inelastic factor supplies, the sign of $\frac{\delta L_a}{\delta \lambda}$ must be positive. Now we turn to determining the sign of $\frac{\delta K_m}{\delta \lambda}$:

$$\frac{\delta K_m}{\delta \lambda} = L_m \frac{\delta k_m}{\delta \lambda} + k_m \frac{\delta L_m}{\delta \lambda} \qquad (21)$$

---

[15]The covariance between U' (ϕ) and (P_m - V) is negative if the firms are risk averse, because the of sign of:

$$Cov\ [U'(\phi), (P_m - V)] = sign U''(\phi) \frac{\delta\phi}{\delta(P_m - V)}$$

and with:

$$U''(\phi) < 0; \quad \frac{\delta\phi}{\delta(P_m - V)} > 0$$

then the:

$$Cov\ [U'(\phi), (P_m - V)] < 0$$

[16]A formal derivation of this result is relegated to a mathematical appendix available from the author upon request.

with $x_2 > 0$, $\frac{\delta K_m}{\delta \lambda}$ is clearly negative, and the sign of $\frac{\delta K_a}{\delta \lambda}$ must be positive.[17]

The above analysis suggests that an increase in uncertainty, under the mean-presenting spread rule, arising from uncertainty about the future prices of exportables leads to movements of resources from the uncertainty sector to the sector facing certainty. This result may have a significant impact on the behavior of the central planners of the Islamic countries, especially if the objective is to focus on the import-substitution sector. Therefore, volatility in the terms of trade under our setting will signal to the planner that resources are moving from one sector to another. This would, in turn, force him/her to plan for alternative policies. Such policies may be directed to stabilize export prices or to prevent the movements of resources from one sector to another.

In the following section, we turn to find the imapct of uncertainty on the income distribution of the factors of production.

Income Distribution and Uncertainty

Equations (19) and (21) suggest that the sign of $\frac{\delta k_m}{\delta \lambda}$ and $\frac{\delta K_a}{\delta \lambda}$ is the same as the sign of $(k_m - k_a)$. This results from the fact that $a'' < 0$, $m'' < 0$, and $D > 0$. Therefore, an increase in λ, and hence in V, contributes to a rise in the $\frac{K}{L}$ ratio in

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[17]These results become clear if we assume $P_a = 1$ initially and differentiate equation (9) and (10) with respect to λ to obtain:

$$\frac{\delta W}{\delta \lambda} = -k_a a'' \frac{\delta k_a}{\delta \lambda}$$

and:

$$\frac{\delta \gamma \bar{\pi}}{\delta \lambda} = a'' \frac{\delta k_a}{\delta \lambda}$$

with $a^{-} < 0$. Therefore the sign of:

$\frac{\delta W}{\delta \lambda}$ is the same,

whereas the sign of:

$\frac{\delta \gamma \bar{\pi}}{\delta \lambda}$ is the opposite sign of $\frac{\delta k_a}{\delta \lambda}$

both sectors if M is capital-intensive relative to A. If both k_m and k_a rise, then, given P_m and V, the wage rate would rise and the cost of borrowing capital would decline in both sectors. Therefore, an increase in uncertainty about the terms of trade causes a decline in the cost of borrowing in sector M and a rise in the income of workers in sector A.[18]

Uncertainty and National Income

Let Y stand for national income. Then, with no impediments in trade:

$$Y = P_m M + P_a A + Z \tag{22}$$

Since producers are expected to be profit maximizers, they maximize the expected value of:

$$\bar{Y} = E[P_m] M + P_a A + Z \tag{23}$$

subject to the constraint provided by the transformation curve:

$$M = M(A) \tag{24}$$

which is assumed to be strictly decreasing and strictly concave for all non-negative A, and the second derivative never vanishes for non-negative A, that is, A′ < 0 and A″ < 0 for all A ≥ 0, where the prime and double prime indicate first and second derivatives, respectively, $\bar{Y}$ represents the expected national income, and Z is the amount of zakat.

Differentiating equations (23) and (24) totally and dividing dM by dA, we obtain:

$$\frac{dM}{dA} = \frac{V(M_k dK_m + M_L dL_m)}{A_k dK_a + A_L dL_a} \tag{25}$$

---

[18]The proof of these results derives from the fact in view of equations (20) and (21):

$$\frac{\delta W}{\delta \lambda} > 0 \; if \; k_m > k_a$$

and:

$$\frac{\delta \gamma \bar{\pi}}{\delta \lambda} < 0 \; if \; k_m < k_a$$

Using the factor market equilibrium conditions (9) and (10) and, from the full-employment conditions, it is clear that $dK_m = dK_a$ and $dL_m = -dL_a$. Therefore:

$$\frac{dM}{dA} = \frac{P_m E[U'(\phi)]}{Cov(U'(\phi), P_m) + VE[U'(\phi)]}$$

with Cov $(U'(\phi), P_m) < 0$ in the presence of risk-averse behavior. Then:

$$\frac{E[U'(\phi)]V}{Cov(U'(\phi), P_m) + VE[U'(\phi)]} > 1$$

Because the above expression is greater than one, it is clear that the sign of $\frac{d\bar{Y}}{d\lambda}$ depends on the sign of $\frac{dA}{d\lambda}$. However, to find the implication of a marginal change in uncertainty for:

$$\bar{Y} = E[\lambda P_m + \delta]\, M + P_a A + Z \tag{26}$$

Differentiating (26) with respect to λ, equating $\frac{d\delta}{d\lambda}$ to $(-V)$ and remembering that $\delta = 0$, $\lambda = 1$, and P_a is given, we obtain:

$$\frac{d\bar{Y}}{d\lambda} = V\frac{dM}{d\lambda} + ME[P_m - V] + P_a\frac{dA}{d\lambda} + \frac{dZ}{d\lambda}$$

$$= P_a\frac{dA}{d\lambda}\left[1 - \frac{VE[U'(\phi)]}{Cov(U'(\phi), P_m) + VE[U'(\phi)]}\right] + \frac{dZ}{d\lambda} \tag{27}$$

With the second expression between the two brackets positive with risk-averse firms, and with $\frac{dA}{d\lambda} > 0$ as shown previously. The sign of $\frac{d\bar{Y}}{d\lambda}$ thus depends on the sign of $\frac{dZ}{d\lambda}$. This is an interesting result, because an increase in uncertainty may cause national income to rise if $\frac{dZ}{d\lambda} > 0$ and greater than the arguments between the the two brackets of equation (27). In this case, the central planner has to focus on

the process of collecting and distributing the zakat payment among the less-fortunate members of the society.

Conclusion

This paper develops a two-sector, two-factor general equilibrium model of a small country. While utilizing the neoclassical two-sector, two-factor international trade model, our analysis goes far beyond that work. We introduce uncertainty within the profit-sharing environment, in the sense that the user cost of capital is not fixed. The country in question is small and thus takes international prices as given, i.e., the expected price of the exportable product is exogenously given and the residents have no say in the determination of the probability distribution of the international price. Our analysis underlines the assumption of a fully operating environment under which Muslims process their zakat obligations on unemployed capital and on the rate of return of productive capital.

Under certain assumptions, among other things, we showed that: a) an increase in uncertainty, under the mean-preserving spread rule, over the future prices of exportables leads to reources moving from the uncertainty sector to the sector facing certainty; b) an increase in uncertainty about the terms of trade causes a decline in the cost of borrowing in the exportable sector and a rise in the workers' income in the importable sector; and, finally, c) the relationship between national income and uncertainty over the terms of trade depends completely on the zakat payment.

While the analysis in this paper dealt with purely theoretical aspects, the framework adopted is quite suitable for investigating a variety of problems with direct policy implications. Therefore, the results obtained here should apply to a wide range of issues of a more practical nature. Furthermore, this paper proved that treating economic behavior under uncertainty as a distortion from the normative view point is not a satisfactory method of analysis, for risk-averse behavior is something natural and can be regarded as an aberration from rational economic behavior. However, there are several interesting issues in welfare economics that deserve extensive treatment but were left untouched because of my perception that the neoclassical general equilibrium model of production is not copious for this purpose.

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A Mathematical Formulation of the Knowledge-Based Worldview of Development

by

Masudul Alam Choudhury

The main objective of this paper is to present a mathematical formalization of a knowledge-based model of development. This model will be seen to comprise intrinsically interactive and evolutionary components. These features of the model are brought together to place the knowledge-based development paradigm in the midst of a polity-market interactive process. We will identify this process with the *shuratic* process. The polity (*shūrā*) is taken here in its most embryonic form: comprehending the entirety of decision making at every echelon of institution and enterprise, whether big or small.[1] Thus the paper is in two parts. Part One formalizes the evolutionary epistemological nature of the knowledge-based model, and Part Two places the evolutionary model in the midst of the *shuratic* process.

The meaning of the symbols used below need to be noted: $>_i$ denotes preference relation for agent i (either in polity or the market order); A c B means A is a subset of B; INT stands for intersection of sets or relations; and Inf denotes infinity.

I: Evolutionary Knowledge-Based Model of Socioeconomic Development

Let k (i) denote various knowledge parameters as the process of knowledge formation proceeds over different phases of development, i = 1, 2, ... In this way, k (i) affects the growth of each evolving theory and paradigm, T (j), j = 1, 2, . . . of development, toward forming unison between them.

Furthermore, k (i) is aggregable over its contributory parts corresponding to every theory/paradigm formation. Thus, k (i, j) are the contributory components of k (i) that influence the jth. theory/paradigm, i, j = 1, 2, . . .

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[1]Such is the precept of *shūrā* given by the Qur'an. The restriction of the idea of *shūrā* to institutional and political decision making at large was an unfortunate development in Islamic history. One may refer to Qur'an 4:59 for specific guidance concerning *shūrā*. In respect to the universality of the *shuratic* process in all of knowledge, one may refer to *sūrah* 42.

The existence of a worldview must accomplish continuity between the theories and paradigms on the basis of the same set of perceptions and axioms. This is achieved by linear relationships evolving, in the long run, between the knowledge parameters. That is, $k(i', j') = a.k(i, j) + k^*$, $i, i', j, j' = 1, 2, \ldots$, and where a is a linear co-efficient of transformation of knowledge parameters $(0 < a < 1)$ and k^* is a targetted knowledge advance factor over phases of development.

k^* is attained in the following way: Consider the sequence:
$\{k(i, 1), k(i, 2), \ldots, k(i, nl), \ldots\}$, where, $k(i, 2) = ak(i, 1) + k^*$,
and $k(i, 3) = ak(i, 2) + k^*$.
That is, $k(i, 3) = a[a.k(i, 1) + k^*] + k^* = a^2k(i, 1) + (a + 1)k^*$,
$k(i, 4) = ak(i, 3) + k^* = a[a^2k(i, 1) + (1 + a)k^*] + k^* = a^3.k(i, 1) + (1 + a + a^2)k^*$, etc.
$i = 1, 2, \ldots$

In this way:
$k(i, n1) = a^{(nl-1)}.k(i, 1) + (1 + a^2 + a^3 + \ldots).k^* = a^{(nl-1)}.k(i, 1) + (1 - a)^{-1}k^*$.

Now, $\lim(nl \to \inf.)\{k(i, 1), k(i, 2), \ldots, k(i, nl), \ldots\} =$
$\lim(nl \to \inf.)\{a^{(nl-1)}.k(i, 1) + (1 - a)^{-1}.k^*\} = (1 - a)^{-1}.k^*$, independent of i. Since $0 < a < 1$, therefore, $m = 1/(1 - a)$ acts as a multiplier on k^*.

This result implies that, in the framework of the worldview in developmentalism, the knowledge-based process unifies the evolutionary system around a multiplier value of a target knowledge parameter, k^* — a planned target. In the iterations over polity-market interactions, this means that, irrespective of the initial point of the commencement of knowledge, the evolutionary process of interactions will lead ultimately to the unification of the theories/paradigms in the form of the worldview.

The sequence of convergence of the knowledge-based evolutionary process can be shown by the following sequences:

k (i) / T (j)	T (1)	T (2)	T (3) . . .	T (nl) . . . .
k (1)	k (1, 1)	k (1, 2)	k (1, 3) . . .	k (l, nl) . . . mk*
k (2)	k (2, 1)	k (2, 2)	k (2, 3) . . .	k (2, nl) . . . mk*
k (3)	k (3, 1)	k (3, 2)	k (3, 3) . . .	k (3, nl) . . . mk.
	.	.	. . . .	. . . . .
k (n)	k (n, 1)	k (n, 2)	k (n, 3) . . .	k (n, nl) . . . .
.	.	.	. . . .	. . . . .
.	.	.	. . . .	. . . . .

Now since mk^* remains independent of the knowledge phase, i, which also marks a level of polity-market interaction, therefore,

$\lim(n \to \inf.)\{k(1), k(2), k(3), \ldots\} = mk^*$.

This is the same as shown by the formalization above. That is, in a state of social consensus, knowledge evolutions become independent of interactions across theories and paradigms, as denoted by $j = 1, 2, \ldots$:

$\lim(n \to \inf.)\, k(n, j) = mk^*$.

To prove this result, let us say that the above limiting value equals $m'k^{*'}$, where $m'k^{*'}$ does not equal mk^*.

Then, $\lim (nl \to \inf.) \lim (n \to \inf.)\ k(n, nl)$ equals either of the following two:

(1) $\lim (nl \to \inf.) (m'k^{*'}) = m'k^{*'}$, or:

(2) $\lim (n \to \inf.) (mk^*) = mk^*$.

Hence, $mk^* = m'k^{*'}$.

Furthermore, the above result is rewritten as,
$(1 - b) k^* = (1 - a) k^{*'}$. That is, $(k^* - k^{*'}) + (ak^{*'} - bk^*) = 0$. If the terms in this expression are both of the same sign, then they must, in fact, be zero individually. Then $k^* = k^{*'}$ and $a = b$. However, if the terms are of opposite signs, then consider, $ak^{*'} > bk^*$, or $k^{*'} > (b / a) k^*$, and $k^{*'} > k^*$. Then, a is either greater than or less than b. On the other hand, if $k^* > k^{*'}$, then $ak^{*'} < bk^*$. That is, $k^* > (a / b) k^{*'}$. Now, a is either greater than or less than b. But since k^*, $k^{*'}$, a, and b are all continuous functions in their domains, thus, by the above result, $b = a$. Hence $k^{*'} = k^*$.

In the above cases, $T(nl) = T(nl - 1) + a^{(nl-1)} K(1, nl) + mk^*$, since T (j) advances under the force of knowledge, that is, with polity-market (ecological) interactions, $j = 1, 2, \ldots$. Therefore we can write: $\lim (nl \to \inf.) [T(nl) - T(nl - 1)] = mk^*$. Hence T (j) advances under the force of the same knowledge parameter as do the individual knowledge experiences, k (i, j).

Characterizing the Tawhīdī Precept in the Model Formulation:

The above characteristic of the universality of k* in the knowledge-based evolutionary system is best signified by the *tawhīdī* worldview. k* then represents an Islamicization target towards which the Islamic evolutionary knowledge-based system moves. As it moves towards k*, the attained knowledge base multiplies progressively in its comprehension of the *tawhīdī* precept. The process of Islamicization then represents the development experience.[2]

In the *tawhīdī* precept of the knowledge-based worldview of development, the Islamic society is seen here to multiply its knowledge base by accepting either one of the Islamic models of development (Islamization) set by the full consensus process (*ijmā'*) or as evolving across several polity-ecology interactions as *ijtihād* proceeds in the ummah. Both of these cases translate into the dynamic and interactive features of the *shuratic* process (Choudhury 1991a).

The consistency between *ijmā'* and *ijtihād* (this may be marked by intertemporal situations of the ummah with less-than-perfect social consensus), as the established part and parcel of the *shuratic* process, can be seen by noting (Maddox 1971):

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[2]This is the way Imām al Ghazālī (d. 1111 CE) thought of human development with respect to knowledge. See his *Ihyā' 'Ulūm al Dīn* (1968). Ibn al 'Arabī thought of the unfolding evolutionary epistemology in similar terms. See Chittick (1989).

$T(l) \subset T(2) \subset T(3) \ldots$ across *ijtihādī* processes, if and only if $k(l) \rightarrow k(2) \rightarrow k(3) \rightarrow \ldots$ across *ijmatic* processes. Both of these were shown above to tend to the same knowledge multiplier base: mk^*.

The above result would hold strictly in infinite *shuratic* processes, because the Islamicization process can never stop. Over the short run, however, the convergence over k (i) for a given *ijmā'* process and over T (j) for given *ijtihādī* process may not yield the same result. This is due to the fact that they will be conditioned by the initial conditions of the knowledge-base that may not adapt fully to the Islamicization process in the short run, although the learning process will exist. Such a case may well be identified with the long interruption of the *ijtihādī* process in the ummah ever since the fourteenth *hijrī* century or earlier. Such finite dimensional evolutionary processes are interesting to study in order to reflect on the historical trends in the Islamicization process.

A finite Islamicization process can be represented by the expression:

$a^{(nl-1)} k(1, 1) + (1 - a^{(nl-1)} / (1 - a)) k^*$, across T (l) to T (nl) with k (l, l) and k (l),
$a^{(nl-1)} k(2, 1) + (1 - a^{(nl-1)} / (1 - a)) k^*$ across T (l) to T (nl) with k (2, 1) and
$a^{(nl-1)} k(2, 1) + (1 - a^{(nl-1)} / (1 - a)) k^*$ across T (1) to T (nl) with k (2, 1) and k (2),

. . . .

$a^{(nl-1)} k(n, 1) + (1 - a^{(nl-1)} / (1 - a)) k^*$ across T (1) to T (nl) with k (n, 1) and k (n).

Likewise:

$b^{(n-1)} k(1, 1) + (1 - b^{(n-1)} / (1 - b)) k^{*\prime}$ across k (1) to k (n) with k (1, 1) and T (1),
$b^{(n-1)} k(1, 2) + (1 - b^{(n-1)} / (1 - b)) k^{*\prime}$ across k (1) to k (n) with k (1, 2) and T (2),
....
$b^{(n-1)} k(1, n1) + (1 - b^{(n-1)} / (1 - b)) k^{*\prime}$ across k (1) to k (n) with k (1, n) and T (n1).

It is now difficult to determine which one of the alternatives shown above will yield the most effective short-run Islamicization process. That remains a matter of historical record and judgment. Hence, Islamicization as a developmental process with an evolutionary knowledge-based model must be considered as a perpetual and continuous interactive process. This is what is meant here by the *shuratic* process.

A Knowledge-Based Model without Linear Interrelationships:

Finally, in the case of no definite interrelationships between the k (i, j) knowledge parameters existing, the evolution of theory/paradigm can at best be seen as being induced by these knowledge parameters, i, j = 1, 2, . Such a knowledge induction is represented by k (i, j) T (j), 1, j = 1, 2, . . . In the totality of change over all T (j), the knowledge induction on T (j) is given by the equality of this total effect on total knowledge output, k (i). This is so, because, as we have seen above in the concept of the worldview, the evolution of T (j) means the attainment of knowledge

k (i), i, j = 1, 2, . . . All these can be written as follows:

$$\begin{array}{llll} k(1,1) & k(1,2) \ldots & k(1,n1) \\ k(2,1) & k(2,2) \ldots & k(2,n1) \\ \ldots\ldots & & \\ k(n,1) & k(n,2) \ldots & k(n,n1) \end{array} \quad \begin{array}{c} T(1) \\ T(2) \\ \cdot \\ T(n1) \end{array} = \begin{array}{c} k(1) \\ k(2) \\ \cdot \\ k(n) \end{array}$$

In the case of interrelationships within the submatrices of this matrix, the rank of the matrix will be reduced. Let us say that gxn_2 of the first k (i, j) are interrelated. Then the above matrix reduces to:

$$\begin{array}{llll} k(g+1,1) & k(g+1,2) \ldots & k(g+1,n1) \\ \ldots\ldots & & \\ k(n,1) & k(n,2) \ldots & k(n,n1) \end{array} \quad \begin{array}{c} T(g+1) \\ \cdot \\ T(n1) \end{array} \quad \begin{array}{c} k(g+1) \\ \cdot \\ k(n) \end{array}$$

which is of full rank (n - g -1) (Johnston 1984).

The rest of the g relations are in the form of k (i, j) and T (j) interrelationships as shown earlier: i = 1, 2, . . , g; j = 1, 2, . . , n_2.

Summary:

In this part, we have shown all possible features of the knowledge-based model of development. The concept of development in this model was shown to take the form of Islamicization of knowledge. This knowledge formation is then shown to constitute a *shuratic* process. We will now formalize this process in the direction of showing how interactions between the embryonic polity (decision-making units) and the market system (ecological order, world systems) is established. This is the central feature of any evolutionary knowledge-based model of development, as it presents the inherent epistemic-ontic circular causation model of change.[3]

II: On the Existence of Interactive Preferences in Explaining Socioeconomic Reality

The objective of this part is, first of all, to prove the existence of joint interactive preferences, $(>_i \text{INT} >_j)(z, t)$, which essentially characterize the *shuratic* process. The symbols mean the interactive preferences between polity $(>_i)$ and the socioeconomic system $(>_j)$, forming interactive preferences $(>_i \text{INT} >_j)(z, t)$ over

[3]The idea of an evolutionary model should not be mistaken here as conveying any idea of social Darwinism, a Kantian epistemology, or a Humean ontology. The fusion between the last two is not a product of any philosophical premise, including Husserl's phenomenology. The pro-found immersion between the epistemic and ontic realities is realized only in the Qur'an. For an account of western philosophy, see Russell (1990).

knowledge parameters z and over time t. Secondly, the existence of viable solutions, in the local sense, can be assigned to the social objective criterion based on the above interactive process acting on the socioeconomic variables.

To prove the first part, we proceed as follows (Debreu 1959): Let $>_i$ be formed with regards to the choice of policy variables $P^* (z_1, t_1)$ at time t_1 for the state of knowledge then existing, z_1. Then, of all possible policy alternatives with (z, t), say $\{Pk (z_1, t_1)\}$, $k = 1, 2, \ldots, m_1$, it can be said that there is a unique policy induced by $(z_1 - t_1)$. That is, $P^* (z_1, t_1) >_i P_k (z_1, t_1)$, $k = 1, 2, \ldots, m_1$.[4] This means either that P* is the most preferred of the m_1 number of policies in the package as influenced by (z, t) or, if m_1 -> inf, then P* is the limit value of the policy vector.

To prove the latter, note that since the infinite set $\{P_k (z, t)\}$ would then be distributed into an infinite number of similar finite dimensional sets of the type given above, then each of these subsets will yield a preferred vector, $P^*_s (z, t)$, s = 1 -> inf. The process of iterations will thus continue. What then emerges is a set of preferred policy choices from which further preferred policy choices can be attained. Hence a preferred policy choice will exist in the limit of s -> inf, for a given (z, t). All of this is true for choices over policy vectors given the relation ($>_i$, (z, t)).

Next, let us examine what happens when z changes, given t. Clearly now, $>_i$ cannot remain constant. Hence $>_i$ can remain stable only in the small neighborhood of z, which we took as either the most preferred point of the finite set or as the limit point of the infinite set of policy choices. Consequent to the change in $>_i$, the cause and effect is a change in z, given t. Now $\{P_k (z, t)\}$ forms a lexicographic function with variations in P_k as z varies, given t. This lexicographic function is shown as follows:

z	P	P_1	P_2	P_3 .... P_n	
z_1		$P_1 (z_1)$	$P_2 (z_1)$	$P_3 (z_1)$ .... $P_n (z_1)$	
z_2		$P_1 (z_2)$	$P_2 (z_2)$	$P_3 (z_2)$ .... $P_n (z_2)$	
z_3		$P_1 (z_3)$	$P_2 (z_3)$	$P_3 (z_3)$ .... $P_n (z_3)$	=A
.		.	.	. .... .	
z_m		$P_1 (z_m)$	$P_2 (z_m)$	$P_3 (z_m)$ .... $P_n (z_m)$	

Now the following two limits will yield the following result:
lim (s -> inf.) $(P_s (z_k)) = P^* (z_k)$, k = 1, 2, ...m.
lim (k -> inf.) $(P^* (z_k)) = P^* (z^*)$, where, {z} is an element of the space T(z). T(z)

[4]This would appear as social choice ordering in Arrow's concept, but is only part of the total preference relationship in the interactive model. See Arrow (1951).

can be shown to be a Banach space (normed topological space) (Choudhury and Malik 1992). Hence z^* exists as lim $\{z\} = z^*$. But note that, by our previous formalization, z^* is the limit of an infinite number of subsets of a finite number of $\{z\}$. Hence z^* is the evolution of z around expanding neighborhoods of z-values. Both of these limiting values are found to exist by our previous formalization.

Next, when t as well as z-values vary, then the following picture emerges on the convergence of different values: First, with t varying, z varies randomly. The case of systematic changes in z is simple. Now another lexicographic mapping, B, is generated in time and over z-values of the type shown by A.[5]

In this case, we also notice that:
lim (t -> inf., k -> inf.) (z_k (t)) = lim (t -> inf.) (z^* (t)) = z^{**} due to the fact that since $\{z\}$ belongs to T(z), a Banach space, wherein a limiting value of z exists, so also any linear transformation of z by the factor of t will belong to T (z). Hence z^{**} must exist.

z \ t	t_1	t_2	t_3 . . . . t_N	
z_1	t_1 (z_1)	t_2 (z_1)	t_3 (z_1) . . . . t_N (z_1)	
z_2	t_1 (z_2)	t_2 (z_2)	t_3 (z_2) . . . . t_N (z_2)	
z_3	t_1 (z_3)	t_2 (z_3)	t_3 (z_3) . . . . t_N (z_3)	=B
.	.	.	. . . . . .	
z_m	t_1 (z_m)	t_2 (z_m)	t_3 (z_m) . . . . t_N (z_m)	

For each of the cases of limiting values discussed above, it can be noted that $>_i$ remains stable only in a small neighborhood of z^*. The case of z^{**} is one of the very long run and, in the Islamic precept, can happen only in the hereafter (*ākhirah*). Epistemologically, this terminal realization of z^{**} is indeed the moment of total reality, where the primordial undiminished stock of *tawhīdī* knowledge will manifest itself. Thus all z-values and the subsequent changes in $>_i$ preferences of polity, are stable in the local sense but unstable in the global sense (Choudhury 1993c).

[5]Lexical mappings convey the idea of non-cooperative games. In the *shuratic* process, such "non-cooperative" features are conveyed by the internal evolutionary dynamics of the polity-market interactive process, which lead to social consensus as the end result. The Prophet Muhammad said that constructive disagreement in the ummah is a sign of blessing.

When changes in z-values are systematic over time, as in the case of $z_k (t + l) = a + bz_k (t)$ or, more generally, $z (k + l, t + l) = a + bz (k, t)$, then matrix B will converge to a point: either a scalar multiple of $\{z_k\}$ or a scalar multiple of $\{z (k, t)\}$, $k = 1, 2, \ldots, m$; $t = 1, 2, \ldots N$. The convergence properties of these sequences is as discussed before. The Markovian process is an example of such systematic variations (Morrison 1991).

The case of finite convergence is trivial, as z^* and z^{**} are then replaced by the largest values in the finite sets of $\{z\}$ and $\{z (t)\}$, respectively. These results on the mathematical existence of limiting values are important as regards the possibility of attaining social consensus and distinct knowledge-formation in the trajectory of the evolution of the polity. A note is to be made on the fact that such existence-results were necessary to establish the preference relation of polity because of the fact and that all socioeconomic perturbations are due either to policy parameters or extraneous effects on the market system.

Next we turn to the questions of the nature and stability of socioeconomic preferences, $>_j$. The market, in pure form *par excellence*, is devoid of instability, as the laws of nature determine the changes in it. However a pure market system is not a reality, as various individual, social, and institutional influences change the pure behavior of markets. In other words, we may perceive two forms of knowledge parameters to be influencing markets, (z_p, z_q), where z_p denotes knowledge parameters conveyed by Islamically unacceptable mainstream sociopolitical forces, and z_q denotes knowledge parameters conveyed by Islamic sociopolitical forces. Both of these parameters, when they contradict each other, inevitably and always perturb the otherwise neutral behavior of markets.

Some substantive points need to be clarified here. In an Islamic political economy, the existence of $\{z_q\}$ is made contingent upon the extent to which socioeconomic behavior is disturbed in prescribed ways by the influence of $\{z_p\}$. Otherwise, there is no particular need to enact $\{z_q\}$, and market forces are left to operate by themselves. Such a polity-market relation is in accord with the importance given to the market system in Islam, on the one hand, and by the presence of the social regulatory organization of the market place (*hisbah*), on the other hand (Holland 1983).

Hence a two-person non-cooperative positive-sum game ensues between $\{z_p\}$ and $\{z_q\}$ (Shubik 1988). The non-cooperative nature of the game is clear because of the independence between the strategies of the two players, each of whom is trying to maximize his own strategies. The positive-sum game is implied by the objective criterion of the Islamic polity (*shūrā*) to score healthy interactive responses from the market-system. This is tantamount to saying that the objective of $\{z_q\}$ is to choose its strategies such that these neutralize the bad effects of $\{z_p\}$ on socioeconomic variables and, thereby, to allow markets evolve by themselves. The degree to which this effect takes place is signalled back to the polity from changes in the socioeconomic system through responses. Because both $\{z_p\}$ and $\{z_q\}$ must necessarily exist, although in varying degrees of intensity over time and knowledge-formation, therefore

$>_j$ must indeed be perturbed preferences — not for any reason of pure market forces, but due to the non-cooperative, positive-game being played between $\{z_p\}$ and $\{z_q\}$.

Now, just as such actions as $>_i$ impact upon the socioeconomic system in terms of the game being played, so also are there responses to polity from the socio-economic system that convey the degree to which a transformation has taken place in the socioeconomic system by past policy variables. Such signals create knowledge formation in the polity, enabling it to expand its old knowledge and undertake fresh rounds of actions. The combination of the polity-to-market action followed by the market-to-polity response forms one complete round of interaction and is equivalent to a formation of knowledge — a z-value.

Let a market response be denoted by $R(x(z_p), x(z_q))$, either for a given time or a varying time t. $x(z_p)$ denotes a socioeconomic vector induced by policy variables revolving around z_p; $x(z_q)$ denotes a similar variable induced by policy variables revolving around z_q. Since z_p and z_q are independent of each other, we can write: $R(x(z_p), x(z_q)) = R_1(x(z_p) \, . \, R_2(x(z_q))$. If $>_j$ corresponds to this response, then for any monotonically positive response where $R_1(x(z_p))$ declines as $R_2(x(z_q))$ increases, all subsequent preferences, $>_j$, must be induced by such transformations of R, for $R_1(x(z_p))$ is non-zero. Since $\{z_p\}$ and $\{z_q\}$ have limit points for all changes in $>_i$, therefore $x(z_p)$ and $x(z_q)$ must exist for such limit points for all changes in $>_j$.

This result establishes, first, the circular relations that exist between the polity and the market system. Secondly, it shows that just as $\{z\}$-values have localized temporary equilibria and are unstable globally around the neighborhoods of z^*-values, so also the socioeconomic system attains temporarily local stable equilibrium points and is unstable globally to the degree that $\{z\}$ must continue to impact upon it (Grandmont 1989).

Finally, having established the existence of ethically induced polity-market interactions, it is implied that a social objective function in (x, z) will exist for the Islamic political economy. Therefore there exists a relationship $W_1: \{z\} \to \{x\}$, such that $x = W_1(z)$. Likewise there exists $W_2: \{x\} \to \{z\}$, such that $z = W_2(x)$; x is an element of the vector, $\{x\}$, z belongs to $\{z\}$. Hence, by the interactive process, there is a composite function: $W = W_2 \circ W_1: \{z\} \to \{z\}$. In other words: $W = W(z) = W(W_1, W_2) = W(x, z)$. z can, moreover, be replaced by its policy induced vector, P (z). Furthermore, since z denotes the progressive gain of z_q over z_p, the social objective function of Islamic polity-market interactions is of the following form (Simon 1960):

Simulate $\{z; (>_i \text{INT} >_j)\}$ $W(x, P(z))$, subject to a series of constraints that can exist between x and P (z). Each formation of z over $(>_i \text{INT} >_j)$ denotes an interaction. One form of such a constraint derived from the interactions is $x(P(z+1)) = a + bx(P(z))$, where a and b are adaptive coefficients (Choudhury 1993b).

The *shuratic* process has now been fully established by logical deductions. Such a process, along with its polity-market interactive ramifications, is seen to be both the means of transformation as well the sustenance of the Islamic political economy.

Such a model has the broadest systemic appeal. However, except in the Islamic case, where ethical endogeneity is the primal nature of knowledge evolution, in all other systems the dichotomy between market variables and ethical (policy) variables will render the interactive process either liberal market-oriented or simply unworkable (Choudhury 1993a).

Perspectives on the Study of the Shuratic Process in Theory and Practice

The theory of the *shuratic* process, as formalized above, is derived from the Qur'anic *ahkām* (rulings). It attempts to present a model that conforms to the concept of such an embryonic socioscientific process as mentioned in Qur'an and the Sunnah. Its theoretical and applicative potentials are immense when one realizes that the present is moving away from neoclassical systems and methodological individualism and towards interactive decision making in a fast-integrating world. Therefore, the focus must lie on applying such a model to the integrating process of the ummah in the present time within the framework of, for example, the Organization of the Islamic Conference, the Arab League, and the Islamic Development Bank as existing institutions (Choudhury 1991b; AbūSulaymān 1991).

AbūSulaymān's model, which can be summarized as follows, conforms with the *shuratic* process model of knowledge-centered development presented in this paper. In Figure 1, we show this conformity. On the right-hand side of this figure is the polity box that, in my terms, comprises the epistemic and institutional basis of the organization of thought and institutions around the Qur'an and the Sunnah. Thereafter, it is subjected to the *ijtihādī* formulation of Islamic *ahkām* through analytical, discursive, and interpretive syllogisms (Gorji 1986).

In AbūSulaymān's model, this takes the form of "Basic Islamic Principles and Values (Ideology)," "Muslim Policy (Dynamic Interaction)," "Muslim Polity's Political Attitudes (Cooperation, Conflict, and Neutrality)," "Muslim Polity's Policies (i.e., Trade, Economic, Cultural, Diplomatic, and War Policies)."

In our model, the Islamic *ahkām* derived in the embryonic *shūrā* is not limited to political institutions and problems alone. Such *ahkām* are developed through interactions between the embryonic *shūrā* and the market (ecology or world systems). In AbūSulaymān's model, this is denoted by "International Systems and Environment."

The media of interactions between polity (in our case *shūrā*) and the markets (ecology, world systems) in our model is through the learning-by-doing process. In more philosophical terms, this is the epistemic-ontic circular causation and continuity model of unified reality.[6] In AbūSulaymān's model, it appears as "Muslim Polities." Thus while AbūSulaymān's model of the "Modern Dynamic Islamic Framework" is focused on the political dimensions, our model of the *shuratic* process is made to

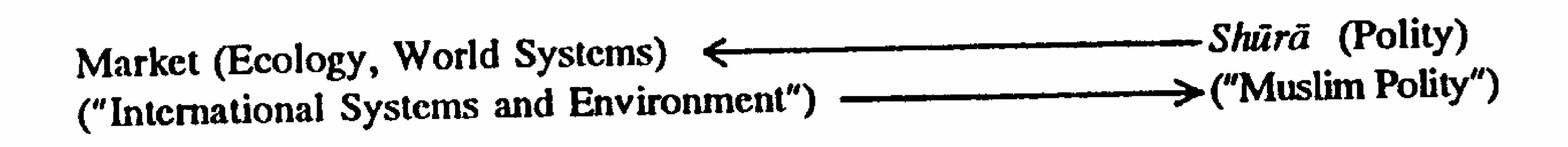
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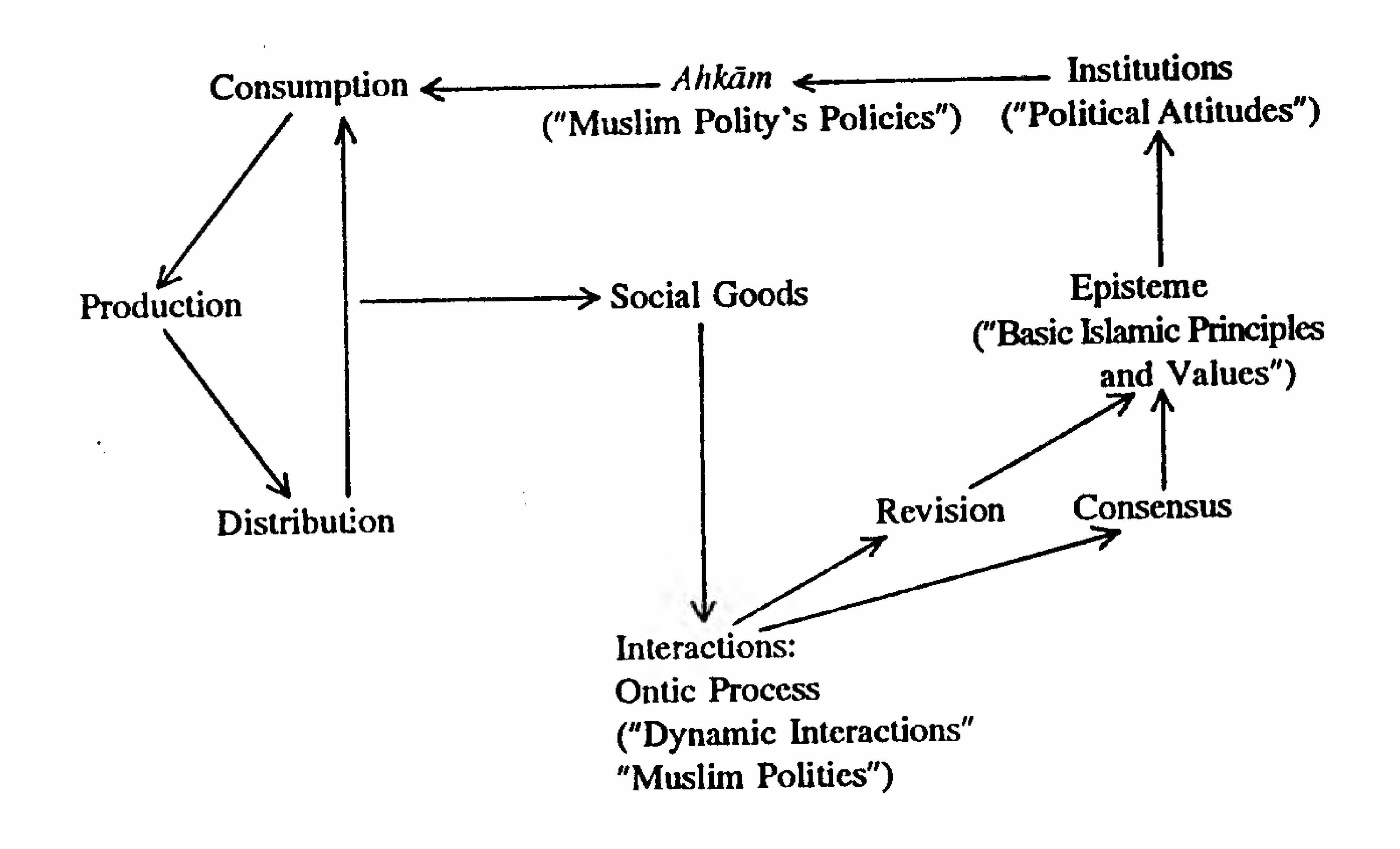
[6]This Qur'anic *ahkām* is the central subject matter of my five-volume work. See Choudhury (1992)

encompass the most generalized methodology to address all issues confronting the ummah intertemporally.

AbūSulaymān's model is, therefore, a positive proof of the validity of the *shuratic* process as a developmental direction based on the knowledge-centered worldview. Our *shuratic* process model of development is thus found to comply with the writings of present-day Islamic thinkers.

Fiqure 1: The Knowledge-Based Model and AbūSulaymān's "Modern Dynamic Islamic Framework": A Comparative View





Note: The bracketted terms represent AbūSulaymān's terminologies.

Sources: A. AbūSulaymān. *The Islamic Theory of International Relations*. Herndon, VA: IIIT, 1991; and M. A. Choudhury. "A Theory of Moral Entitlement." In *Resource Mobilization and Investment in an Islamic Economic Framework*, edited by Zaidi Sattar. Herndon, VA: AMSS and IIIT, 1992.

However, in the present plight of repetition of the neoclassical and methodologically individualist model of thought and polity in Muslim countries, the obvious absence of the *shuratic* process is seen to persist. In the face of this sad and deepening non-*shuratic* experience, the onroads to global integration between Muslim countries presently lacks purposeful direction. The Muslim countries are thus unable to muster their sociopolitical and resourceful strengths to discover what Goulet (1971) referred to as life-sustaining goods.

If the future of Islamic regeneration as a conscious force, and not simply as a naturally endowed veritable reality, is to rest on the new epistemological foundations, then the *shuratic* process appears to be the only way for reorganizing the ummah's thought and institutions (Sardar 1988). These directions are indeed the indispensable ingredients of the developmental process based on the precints of the Qur'anic knowledge-centered model, which replaces the neoclassical notion of human resource development and the dualistic mentalistic order of all of occidental and oriental cultural pluralism.

Conclusion

Between the two parts of this formal paper, it was our objective to unravel and analyze the structure of evolutionary knowledge formation and the inherently interactive *shuratic* process underlying the evolutionary epistemology of the knowledge-based model. All concepts of development (the specific one being socioeconomic development and the general one being Islamicization of knowledge), are found to rest essentially on the type of formal model of development presented in this paper. The universality of the *shuratic* process in both the socioeconomic system and the scientific system are of a unified nature. This is due to the underlying essence of *tawhīdī* precept that characterizes the *shuratic* process (Choudhury 1993d). Furthermore, because of the universality of the *shuratic* process, it must be of the most embryonic nature without exception.

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Investment in Human Capital Financed by Profit and Loss Sharing Contracts

by
Jamshed Y. Uppal

The philosophy of "growthmanship" has preoccupied leaders and economists alike of all countries, irrespective of their socioeconomic, religious, or ethical system and national wealth, for almost half a century. The process of capital accumulation, which includes human resource development and technological progress as well as increases in physical capital stock, occupies a central place in this philosophy. The significance of human resource development to the process of economic growth is widely accepted. For example, Harbison (1973) states that:

> Human resources . . . constitute the ultimate basis for wealth of nations. Capital and natural resources are passive factors of production; human beings are the active agents who accumulate capital, exploit natural resources, build social, economic and political organizations, and carry forward national development.

Numerous studies (Denison 1962; Solow 1957) have shown that the principal source of economic growth in western nations was human, not physical, capital.

Todaro (1989) defines human capital as "productive investments embodied in human beings. These include skills, abilities, ideals, health etc., that result from expenditures on education, on-the-job training programs, and medical care." The concept of human capital encompasses not only the number of people and their skill levels, but also "their cultural outlooks, attitudes towards work, and desire for self-improvement." From the view of the society, therefore, investment in human capital should be evaluated by considering social costs and benefits. On the other hand, private firms also invest in human resources with a view to improving the quality, and thus the productivity, of their human capital. Such investment has an effect on a firm's long-term earning potential similar to that of an increase in its physical resources. Moreover, direct physical investment in buildings, equipment, and materials

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will make formal schooling, vocational, and on-the-job training programs more effective. Thus the concept of investment in human resources is analogous to that of investing in physical capital. Researchers have analyzed human capital investment decisions by using familiar capital budgeting techniques (Becker 1971; Thurow 1970).

The object of this paper is to examine human capital investment decisions in an Islamic economy where the permissible mode of financing is a profit and loss sharing (PLS) contract. We develop a general model of the cost of capital and investment decisions in which financing is obtained under a PLS contract and then draw comparisons with interest-based investment decisions in light of extant literature in corporate finance. From the examination of the investment decisions of an individual firm, we hope to derive implications with respect to the levels of aggregate investment and, more specifically, of investment in human capital in the economy. We employ the general concept of investment to include investment in human capital. The scope of the examination is narrow: the point of view of a private entrepreneur evaluating a human resource development project.

The question of the impact of interest-free financial instruments on investment levels in a given economy has considerable significance for those economies undergoing a conscious process of Islamization. Since interest (*ribā*) is forbidden and profit is allowed, profit and loss sharing (PLS) contracts have been advocated as viable alternatives to interest-based financing and as being the closest to the concept of *mudārabah* and *mushārakah*.[1] Financial institutions in almost all Islamic countries have engineered financial instruments based on the PLS concept, and researchers have built financing models based on PLS contracting with a view to examining the aggregate saving and investment behavior or providing a general equilibrium model under an interest-free economic environment (i.e., Khan and Mirakhor [1989], Khan [1990], Sattar [1990], Basheer et al. [1990], and Khan [1989]). Such models, though instructive, generally fall short of integrating themselvles into the current capital structure theory and empirical evidence in corporate finance.

The paper is organized as follows. The first section lays down the basic analytical framework of PLS financing under the assumptions of a perfect market. Implications arising from the model are discussed. The second section examines the effect of introducing market imperfections. We compare PLS financing with debt financing in light of existing finance literature on investment decisionmaking and capital structure. The third section examines the implications for investment in human capital that result from our model. The conclusions and summary comprise the final section.

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[1]The following definitions are generally used. *Mudārabah:* A unit trust agreement between a lender (a financial intermediary) and an entrepreneur (the *mudārib*) whereby the lender agrees to finance the entrepreneur's project and shares in the profit or loss according to a predetermined ratio. *Mushārakah:* An equity participation or cooperative agreement under which an Islamic financial institution provides funds that mingle with the funds of the business enterprise and others. All providers of capital are entitled, but may decline, to participate in management. Profit is distributed among the partners in proportion to their respective capital contributions.

Firm Value and Cost of Capital under a PLS System

Firm's Objective:

Economic theory has used the objective of maximizing net income (operating profits minus interest expenses) to determine optimum investment levels by equating the marginal return to capital to the rate of interest. Models based on the profit maximization objective have been used to build such macroeconomic models as the familiar Keynesian aggregate investment function. When returns are uncertain and financing is provided by different sources, the acceptable approach is to use wealth maximization criterion to analyze alternative financing and investment decisions.[2]

To illustrate the difference between the two methods, take the case of a firm over a single period. The firm starts with an initial investment of I at time $t = 0$ and generates a single operating cash flow of X_1 at time $t = 1$. The investment is financed through equity (S) and debt (D) carrying a rate of interest of i. The net profit *before tax* at time $t = 1$ can be represented as:

$$\pi_1 = X_1 - \delta - iD \tag{1}$$

where δ denotes economic depreciation and, in this case, equals the initial investment I. The profit measure corresponds to accounting net income. Many authors, among them Haque and Mirakhor (1986), Sattar (1990), Basheer et al. (1990), and Khan (1990), have used an objective function in the general form of equation (1) when analyzing investment decisions. Such a function is not useful for examining investment decisions under alternative financing schemes, as the measure of economic income requires a net increase in the firm's wealth after accounting for the opportunity cost of *all* components of capital (i.e., equity as well as debt). If we denote the required rate of return on the equity capital as r, reflecting the opportunity cost of equity capital, then the economic profits, according to the wealth maximizing criterion, are defined as:

$$\Delta W = X_1 - I - iD - rS$$

$$= X_1 - I\,(1 + iD/I + rS/I)$$

Noting that $I = S + D$:

$$\Delta W = X_1 - I\,(1 + iD/(D + S) + rS/(D + S)\,)$$

Writing the expression $iD/(D + S) + rS/(D + S)$, generally known as the weighted

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[2]For further discussion, see Modigliani and Miller (1958) and Durand (1952). This issue also relates to the debate over capitalization of NOI vs. NI.

average cost of capital, and representing the marginal cost of capital as WACC, we get:

$$\Delta W = X_1 - I\,(1 + WACC) \qquad (2)$$

The present value at time $t = 0$ of the increase in wealth ΔW, or the net present value (NPV), can be obtained by dividing both sides of equation (2) by 1 + WACC:

$$NPV = X_1/(1 + WACC) - I \qquad (3)$$

The firm continues to invest in projects as long as the NPV of the marginal project is positive. Investment levels then become a negative function of WACC.[3]

A Mudārabah Investment Model:

We will now consider the investment decision of a firm financed by a PLS contract. Starting with the typical perfect market assumptions, we posit that: a) capital markets are frictionless and complete; b) there are no bankruptcy costs; c) managers act in the interest of owners and thus there are no agency costs; d) there are no personal or corporate taxes; and e) investors have homogeneous expectations, for information is symmetrical and costless (i.e., there are no signalling opportunities).

The perfect market model is introduced to establish a base case. The effect of introducing imperfections into the market are then studied to see in what way they affect the conclusions of the perfect market model.

The decision unit is a firm that has access to a set of investment opportunities specific to it. The firm raises funds in two ways: a) owners' equity as common stock, with the market value denoted as S, and b) under PLS contracts, with market value denoted as M. The PLS contract, which comes close to the concept of *mudārabah*,[4] requires that all profits and losses be shared between the common equity investors and the *mudārabah* investors according to a negotiated ratio k, such that *mudārabah*-holders receive $m = kX$ and equity-holders receive $s = (1 - k)\,X$.[5] Let the equity investors require a minimum rate of return of r_s, and the *mudārabah* investors require a minimum rate of return of r_m. The required rates of return may be based on the opportunity cost to the investors or thought of as the inverse of the

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[3]WACC here is the *marginal cost of capital.* The cost of debt in WACC is not adjusted for taxes here for the sake of simplicity. In addition, we want to abstract from the tax system, another public policy issue, for reasons explained in the second section.

[4]The term *mudārabah* is being used here to include *mushārakah*.

[5]The firm's equity holders need not contribute cash, for they would still have equity in the firm with a certain market vaue as long as $E\,[s] > 0$.

capitalization ratio, the price of a stream of cash flows. The concept of a required rate of return is considered acceptable in Islam by several scholars (see Khan [1990]).

According to the wealth maximizing criterion, the marginal project must meet the following condition:

$$\Delta W = X_1 - I - r_m M - r_s S > 0$$

or:

$$NPV = X_1/(1 + WACC) - I > 0 \quad (4)$$

where WACC is now defined as:

$$WACC = r_m M/(M + S) + r_s S/(M + S) \quad (5)$$

Now consider a firm which continues to generate, in perpetuity, a stochastic operating income of X_t per period with an expected value of E[X]. Prior to the investment in the new project under consideration, the firm is not growing and the depreciation expense equals the periodic investment required to maintain the earning power of the firm, so that X_t represents a distributable cash flow.

Valuation of Equity and Mudārabah Securities:

Let ρ be the required rate of return for an all-equity firm given its class of risk. Then the value, V^e, of the firm is:

$$V^e = E[X]/\rho \quad (6)$$

On the other hand, the value of a firm financed by equity as well as *mudārabah*, V^m, is given by discounting cash flows to the security holders at their respective required rates of return.

$$V^m = E[X](1 - k)/r_s + E[X]k/r_m$$

$$= E[X]/r_s - E[X]k/r_s + E[X]k/r_m \quad (7)$$

Since the random variable X (representing total cash flow to the security holders) is the same as in equation (6), it must be discounted at the same rate, r_s. Thus equation (7) can be rewritten as:

$$V^m = E[X]/\rho - E[X]k/r_s + E[X]k/r_m \quad (8)$$

Modigliani and Miller (1958) showed in their famous Proposition I that "the market value of any firm is independent of its capital structure and is given by capitalizing its expected return at the rate ρ_k appropriate to its class." Though they proved this proposition rigorously by applying their well-known arbitrage argument, the underlying reasoning is based on the law of one price, i.e., earnings that differ only by a scale factor will differ in value only by a scale factor such that capitalization ratios for equally risky streams should be equal. This fundamental theorem has been studied exhaustively in finance and remains robust despite its seemingly limiting assumptions. In particular, Stiglitz (1969) proved this using a state-preference framework, and Rubinstein (1973) provided a proof using a mean-variance approach (see Miller [1988] and Modigliani [1988] for review).

Following Proposition I, the value of an all-equity firm must be equal to the value of a *mudārabah*-financed firm: $V^e = V^m$, or:

$$E[X]/\rho = E[X]/\rho - E[X]k/r_s + E[X]k/r_m,$$

and it follows that:

$$r_s = r_m = \rho \tag{9}$$

In other words, the required rate of return on *mudārabah* and equity securities would be the same. This result is not surprising, for the cash flows to both security holders differ only by a scale factor.

Determining the PLS Ratio:

Given the required rates of return on the part of equity holders and *mudārabah* holders, the PLS ratio will be determined such that the investors' required rate of return will equal their expected rate of return: $r_m = kE[X]/M$ and $r_s = (1 - k)E[X]/S$. We have shown above that, under perfect market assumptions, $r_s = r_m$. Therefore $kE[X]/M = (1 - k)E[X]/S$, or:

$$k = M/(M + S) \tag{10}$$

and:

$$1 - k = S/(M + S) \tag{11}$$

or the two investor classes will share income according to the proportion that the market value of their investment bears to the total value of the firm. Determining the PLS ratio k, therefore, becomes a capital structure decision. In addition, if, in order to implement the sharing relationship, *mudārabah* holders are issued N_m shares proportionately such as, for example, $N_m/(N_m + N_s) = k = M/(M + S)$, then it can be

shown that the price of each *mudārabah* share and common share will also be equal.[6] Then the WACC for the firm can be rewritten as:

$$WACC = r_m k + r_s(1 - k) \tag{12}$$

The *Mudārabah* Risk:

Under the mean-variance approach to portfolio selection, the variance or the standard deviations of the returns are used as a measure of total risk when diversification opportunities are not available. In the case where the market allows well-diversified portfolios to form the appropriate risk measure as suggested by the Capital Asset Pricing Model, developed by Sharpe (1963), Mossin (1966), and Lintner (1965), the systematic risk is measured as $\beta = Cov(R_i, R_m)/Var(R_m)$, where R_m is the return on the market portfolio. The realized return on *mudārabah* at time t is:

$$\bar{r}_{m,t} = m/M = X_t k/(E[X]k/r_m) = X_t r_m/E[X]$$

The variance of $\bar{r}_m$, therefore, is:

$$Var(\bar{r}_m) = Var(Xr_m/E[X]) = (r_m/E[X])^2 Var(X)$$

$$\text{Since } r_s = r_m,\ Var(\bar{r}_s) = Var(\bar{r}_m) \tag{13}$$

The systematic risk of the *mudārabah* securities is measured by the covariance of their returns with market returns, and since $r_s = r_m$:

$$Cov(\bar{r}_s, R_m) = Cov(\bar{r}_m, R_m) \tag{14}$$

It follows that $\beta_m = \beta_s$. Therefore the total risk, as well as the systematic risk, of *mudārabah* securities is equal to that of equity securities.

Implications:

In view of the above analysis, it is apparent that, on the basis of return and risk considerations, *mudāraba* and equity securities are indistinguishable. It follows that:

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[6]Note that $N_m = (N_m + N_s)\,M/(M + S)$ and that $N_s = (N_m + N_s)\,S/(M + S)$. The value of a *mudārabah* share (P_m) is the total value of *mudārabah* divided by the number of *mudārabah* shares:

$$P_m = M/N_m = M/\{(N_m + N_s)\,M/(M + S)\} = (M + S)/(N_m + N_s).$$

Similarly, the value of a common share (P_s) is:

$$P_s = S/N_s = S/\{(N_m + N_s)\,S/(M + S)\} = (M + S)/(N_m + N_s).$$

lemma 1: WACC is invariant to the PLS ratio k.

Proof follows from the above-mentioned Proposition I, from the definition of WACC in equation (12), and from the result in equation (9), $r_s = r_m$. Therefore investment, which is a negative function of WACC, is also invariant to k.

lemma 2: Firm risk is invariant to the PLS ratio k.

Any change in the PLS ratio leaves the total risk of the firm unaffected. The lemma follows from the results in equations (13) and (14), which show that $Cov(\tilde{r}_s, R_m) = Cov(\tilde{r}_m, Rm)$, and $Var(\tilde{r}_s) = Var(\tilde{r}_m)$.

One immediate implication of these results is that perfect market models based on investment levels as a function of the PLS ratio may not be very useful. For example, Haque and Mirakhor (1986), Sattar (1990), and Basheer et al. (1990) have built macroeconomic models that employ the profit-sharing ratio as an independent variable in the investment function. Khan (1990) presents a microeconomic model and shows investment levels as a function of the PLS ratio. As has been shown here, when the firm's objective function is properly defined, the PLS ratio is not a determinant of the investment levels. Due to the mis-specification of the objective function, some conclusions of these papers may not be valid.

Our analysis implies that *mudārabah* contracts are not different from equity participation and, when the Modigliani-Miller proposition holds, will not increase the firm's value or reduce its cost of capital. This is contrary to the conclusion of Khan (1989), who has shown that a "variable return scheme" (i.e., PLS) dominates a "fixed return scheme" (i.e., debt financing) under perfect markets assumptions and is pareto optimum. His conclusion contradicts of the Modigliani-Miller proposition and is driven by two assumptions. First, he assumes that asset returns are uncorrelated. This assumption is untenable in the face of empirical evidence and is contrary to the assumption generally made in modern portfolio theory. Second, his model assumes, implicitly, that equity holders make decisions based on a rate of return on the total investment rather than on a rate of return on the value of their equity.[7] The second assumption is also contrary to current financial thinking and is made without providing any justification.

Cost of Capital with Market Imperfections

We have seen that in perfect markets, *mudārabah* and equity securities are hardly distinguishable. We have shown that, in perfect markets, $r_s = r_m$ and WACC is invariant to capital structure decisions. This result would also serve to establish a base line case with which we can compare debt financing to draw conclusions re-

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[7]In Khan (1989), the share holders receive z(max (R - D, 0)), where z is the size of the project and R is expressed as a percentage return on total investment.

garding investment functions in different financing environments. However, in perfect markets, the use of leverage would leave the firm value unaffected. Thus the perfect markets case is only of limited use when comparing *mudārabah* financing with debt financing. For studying the impact on investment levels, it is more instructive to examine the effects of introducing market imperfections. Investment levels may be reduced under a system that prohibits fixed *ex-ante* return contracts if the cost of capital to the firm is higher than that of interest-based financing. Two kinds of imperfections, security related and market related, can affect the conclusions of our perfect markets model.

Security Related Imperfections:

The concept of *mudārabah* instruments is broad enough to allow for a variety of contracts. However, such key features of *mudārabah* securities as voting rights, maturity, preference over equity claims, and conversion can differ from common stock. Their effect on the cost of capital are discussed below.

Control and Voting Rights: Voting rights carry a certain value and, in case the *mudārabah* securities are non-voting, as is the case in practice, they will be discounted. This discount will lower the firm's value and hence raise the cost of capital.

Maturity: Mudārabah instruments are mostly term instruments as opposed to common stock, which represents the "permanent" capital of the firm. If the securities are redeemable at the current market value, true to the PLS spirit, the firm may have to issue fresh securities, either equity or *mudārabah*, to finance the redemption. In the presence of flotation costs, the effect of limited maturity will reduce the market value of the firm and increase its cost of capital.

Preference: If a preference over the equity claims as to the distribution of income or proceeds from the sale of the assets in dissolution is demanded by the *mudārabah* investors, it will come at the cost of the equity holders.

Flotation Costs: In the presence of such market imperfections as asymmetric information, the flotation costs of equity and *mudārabah* securities would differ. In case equity holders are insiders having superior information, the flotation cost of *mudārabah* securities will be higher.

The conclusion emerging here is that issuing *mudārabah* securities is likely to increase the cost of capital. We may conclude, conservatively, that the cost of *mudārabah* will, at least, equal the cost of equity i.e., $r_m \geq r_s$. This result can be used for comparison with debt-financed firms. If, however, debt instruments reduce the cost of capital to the firm, then investment levels will be higher for debt-financed firms.

Market Related Imperfections:

In studying the relationship of debt and firm value, as well as the cost of capital and investment decisions, we rely heavily on the existing theory of capital structure.

The existing body of literature is voluminous, and we can present here only the dominant themes. Interested readers may refer to Harris and Raviv (1991) or Masulis (1988) for an exhaustive review. Most of the discussion in the literature is conducted in terms of an optimal capital structure in the presence of market imperfections. Such optimality implies that as long as there is some debt in the capital structure, the cost of capital is lower than with an all-equity financing alternative.

Taxes: In applying the capital structure theory to an analysis of the effects on investment, we cannot draw on the so-called "static trade-off hypothesis," under which the firm is portrayed as balancing the value of interest-related tax shields against various bankruptcy or financial distress costs. The value of debt as a tax shield is not relevant here, because, from the point of view of public policy, the taxation system itself becomes a decision variable. On the other hand, several theoretical strands that assume various imperfections in the market suggest that issuing debt would reduce the cost of capital to the firm and, hence, increase investment.

Bankruptcy Cost: A major disadvantage of debt is that it increases the probability of bankruptcy. A moderate amount of debt, however, does not significantly increase the expected cost of bankruptcy. The expected cost of bankruptcy, up to an optimal debt-equity ratio, is less than the advantages of debt, which results in a net gain to debt. It may be noted here that there may be instances in which the conflicts between *mudārabah* and equity holders may not be resolved without cost and may actually result in dead-weight losses akin to bankruptcy costs. Such events may revolve around issues of income determination, distribution in the event of dissolution, liquidation decisions, corporate control, mergers and acquisitions, and conversion.

Agency Costs: These costs arise from potential conflicts of interest between share holders and managers (i.e., excessive perquisite consumption) and between share holders and debt holders (i.e., the possibility of "asset substitution"). Jensen and Meckling (1976) argue that there is an optimum combination of outside debt and equity that will minimize the total agency cost and, hence, an optimal capital structure will exist even in the absence of taxes or bankruptcy costs. Debt plays a role in reducing the amount of "free" cash available to managers and, hence, in reducing excessive perquisite consumption (Jensen 1986) or in reducing the possibility of suboptimum operating decision (Harris and Raviv 1990; Stulz [1990]).

Agency costs are mitigated, to some extent, by designing contracts and externalizing monitoring cost. Agency costs of debt, however, are more amenable to the use of such contractual methods as the use of restrictive covenants in bond indenture and secured loans to reduce the cost of enforcing and monitoring contracts (Scott 1976).

Researchers in Islamic finance have recognized the agency problem as one of "moral hazard." Haque and Mirakhor (1986), for example, note that in the absence of a framework to safeguard a contract's terms, "monitoring costs could be prohibitive and investment could consequently be discouraged." A similar conclusion is reached by Khan (1989). Haque and Mirakhor (1986) have argued that the implementation of a legal and institutional framework to facilitate contracting is well provided for within Islamic law and values. However, it needs to be shown that the

monitoring costs of profit-sharing contracts would be lower than those of conventional debt contracts under the same set of legal environments as envisaged by the Islamic system.

Asymmetric Information: Myers and Majluf (1984) show that in the presence of asymmetrical information, when firm managers or insiders possess superior information regarding the firm's returns and investment opportunities, external financing imposes additional costs in the sense that the firm may not choose to issue new securities. In other words, it will pass up a positive NPV investment opportunity. If the firm has to raise external funds, it is better off issuing debt than equity, for issuing safer securities would minimize the possibility of undervaluation by investors. Ross (1977) has shown that the use of debt can serve as an unambiguous signal to outsiders as to insider information on the firm's prospects. In the signalling model of Leland and Pyle (1977), the use of debt allows the entrepreneur to retain a larger fraction of the equity and to signal to the market the quality of the firm's investment opportunities.

Following asymmetric information models, if debt securities are prohibited the chance of not investing in positive NPV projects would increase, which would lead to a decline in investment. Khan (1989) acknowledges the role of debt in minimizing the "information requirement of a financial contract, when the performance of the project is not observable by the financial institution," and suggests that externalities in the information industry can decrease the cost of monitoring and reduce any moral hazard. It is, however, not clear as to how asymmetries regarding the future prospects of the firm, as opposed to its *performance,* can be reduced by monitoring.

Implications for Human Capital Investment

We have shown that, under perfect market assumptions, the cost of capital with *muḍārabah* financing will be at least equal to the cost of capital in an all-equity financed firm. On the other hand when market imperfections are considered, such as those relating to agency and asymmetric information, the use of debt can reduce the cost of capital. It follows that when debt financing is constrained, the cost of capital to a firm will be higher and investment levels will be lower.

There are immediate implications for the levels of investment in human capital. From the narrower perspective of an individual firm, investment in human development projects is likely to be less under the PLS mode of financing. This implication also extends to an individual who is considering investing in his or her own human capital by entering educational and skill-building programs. Investment in human capital from public sources will also be less if decisions are based on similar NPV techniques. Nevertheless, the investment decision analysis presented here needs to be modified to incorporate social benefits and costs.

Our results have major implications not only for firm managers, but also for host-country policy makers. A decline in investment levels would be detrimental to

the economic growth and employment objective of these countries. The accumulation of human capital will suffer, firstly, as less investment is undertaken and as less employment is created and, secondly, as more human resource development projects (i.e., on-the-job training) become unacceptable from the financial point of view.

The analysis presented here, however, is qualified in more than one way. As a partial analysis, we have not taken into account many qualitative changes that may occur following a complete transformation of an Islamic society. Changes in the time preference of investors, the legal system, business practices, and moral outlook are likely to mitigate the agency and moral hazard problems discussed here. Moreover, Islamic exhortations towards self-development, literacy, and education are unmistakably positive and are likely to have a profound impact on the overall process of human resource development.

Summary and Conclusions

The paper analyzed the question of investment levels in human capital in an economy where financing is based on profit and loss sharing arrangements. We treated the question of human resource investment as a capital budgeting problem, taking the viewpoint of a wealth-maximizing firm. From such a viewpoint, the firm compares the cost of the human resource development projects with the benefits accruing in the form of incremental cash flows from increased human capital productivity. Benefits that are external to the firm are irrelevant from the firm's narrower perspective.

A simple PLS model showed that under perfect market assumptions, the PLS ratio reflects the capital structure of the firm. The ratio itself does not affect the investment decisions under perfect market assumptions, for the cost of capital is invariant to the PLS ratio. We have shown that, under perfect market assumptions, the cost of capital with *mudārabah* financing will be at least equal to the cost of capital of an all-equity financed firm. When market imperfections are considered, such as those relating to agency and asymmetric information, the use of debt can reduce the cost of capital. The implication is that when debt financing is constrained, the cost of capital to a firm will be higher and investment levels will be lower. This result is contrary to that of several earlier papers, which have shown that investment levels either would not decline (Khan 1989) or may even increase (Haque and Mirakhor 1986) with the replacement of debt financing by PLS instruments.

In sum, we can say that existing corporate finance literature points to a negative effect on investment when debt instruments are excluded from a firm's available financing options. However, the behavior of investment under the Islamic interest-free system may also be influenced by changes in the investors' time and risk preferences, qualitative changes in contracting behavior, a lowering of moral hazard, and an increase in expected returns. The totality of these issues precludes a definitive answer.

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Firm Level Decisions and Human Resource Development in an Islamic Economy

by
Abdul Aziz

Japan and Germany were totally destroyed during the Second World War. Their industrial complexes lay in ruins after the devastating Allied air bombardments. Both countries emerged from the war under Allied occupation and with almost all of their manufacturing facilities and infrastructures, such as transportation and telecommunications, paralyzed. A picture of war-ravaged Japan appeared in the *Nippon Times* of 23 September 1946:

> In Tokyo, 70 percent of the area of the city was destroyed, in Osaka 80, in Nagoya 90. Transportation was limited to crowded, creaky trains, hand-pulled two-wheel 'rear cars' designed to be attached to bicycles and ox carts. At war's end, in all of Japan there were only 41,000 motor vehicles, half of them inoperable and almost all the rest powered by charcoal fumes. There were no street lights at night and very few house lights.

Germany's infrastructure suffered a similar fate:

> The condition of Germany at the end of World War II was desperate. The country seemed to be one vast rubble dump. The economy was in ruins; factories, railroads, ports, and canals had been destroyed; and many millions had lost their homes. Many factories that had escaped destruction were being dismantled for reparation payments. (*Colliers Encyclopedia* 1986)

The only resource that these two countries still had was their people. Through effective use, within thirty years they became strong competitors of their erstwhile occupiers. Their example shows that human resources play a major part in the process of national development. Empirical research shows that both aggregate productivity and economic growth increase along with the development of indigenous human

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indigenous human resources. Denison (1985) indicates that between 1929 and 1982, 73 percent of economic growth in the United States was due to human resource development. He adds that physical capital added only 17 percent, while land improvement added zero percent to long-term economic growth. Carnevale (1983) reports that "seventy-five percent of the improvement in productivity in the U.S. since 1929 can be attributed to human resource development activities such as on-the-job training, education, formal training and health."

In an emerging global economy, human resource development has assumed greater importance. Factors of production, such as money, factories, equipment, and technology can be moved easily from one country to another. Only human resources are relatively immobile. A nation's economic competitiveness depends upon the quality of this factor. With reference to the current economic problems of the United States and other countries, Reich (1991) expresses the following opinion:

> The real economic challenge facing the United States in the years ahead—the same as facing every other nation—is to increase the potential value of what its citizens can add to the global economy, by enhancing their skills and capacities, and by improving their means of linking those skills and capacities to the world market.

The relevance of human resource development to economic growth only emerged as an important economic school of thought after the Second World War. Islam, however, emphasized the importance of this factor fourteen hundred years ago. At the present time, Muslim countries have abundant human resources. Their combined population is more than one billion. Unfortunately this resource remains undeveloped. "The present-day Muslim socioeconomic environment is such that it is unable to motivate people to render their best either in their own interest or in the interest of the society," writes Chapra (1988). Thus many Muslim countries, in spite of their huge human and material wealth, are forced to import goods—such as breakfast cereals—from non-Muslim countries. Almost all Muslim countries depend on non-Muslim nations for their defense equipment, a development that has led them to be blackmailed and often humiliated. The development of indigenous human resources could put them on the world map as industrially advanced countries able to manufacture every item needed for both consumption and defense.

Human resource development requires action at both the macro- and microlevels. At the macrolevel, governments must provide infrastructures conducive to the development of this resource—the building of schools and universities, for example. Fiscal policies would have to be designed to channel resources to this end. Capital markets should be developed, for they would accelerate the growth rate of human capital (Levine 1991). At the microlevel, firms have to implement strategies, plans, policies, and practices designed to develop their employees' intellectual and technical skills and thereby improve their productivity and quality consciousness.

This paper will investigate various personnel- and production-related decisions made at the firm level in the light of Islamic teachings. It will also discuss the ef-

ficacy of these decisions vis-à-vis the development of human resources by Muslim nations seeking economic advancement. Before discussing the formulation of corporate strategies and policies, however, we must understand what is meant by the term "economic development," first as currently defined and then as defined from the Islamic viewpoint. In addition, similarities and differences in the two contexts should be explored. Based on this analysis, a case can be made for adopting and/or modifying current western-global strategies and, if necessary, designing entirely new techniques for human resource development.

In the West, economic development is concerned with increasing per capita income and seeking material advancement. According to Mishan (1973), economic growth refers to the increase in per capita income. Rostow (1960) explains economic development in terms of a number of propensities,[1] such as the propensity to develop fundamental science and the propensity to consume. According to such reasoning, an economy is said to be developed if the average per capita income is increasing and people are motivated to learn and apply sciences in order to maintain an increasing supply of consumer goods and services.

The Islamic concept of economic development is wider, for it includes and accords an important role to the moral and social dimensions that are absent from western economic concepts.[2] A person in the West works hard to increase his/her per capita income and consume or save more, as does a Muslim. However, a Muslim also works with the intention of pleasing God. Such an attitude is found in the Qur'an: "When the prayer is finished then disperse in the land and seek the bounty of Allah, and remember Allah much that you may prosper" (62:10). According to a hadith, the Prophet kissed a woodcutter's hands and told him that Allah loved him for the hard work he did. Both the Qur'anic verse and the hadith stated above indicate that a Muslim who works is also actively seeking God's pleasure in addition to earning a living.

Also addressed in this article are: a) the development of the general educational background of the masses and the role of the firm in this process; b) specific personnel and production policies, such as staffing, wage setting, and health care; and c) conclusions and recommendations.

General Education

General Education of the Masses. In addition to operating in an internal environment, a firm also operates in an external environment, for it is part of the commu-

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[1]See Mannan (1986) for a detailed discussion of the concept of economic growth in the light of economic teachings.

[2]This argument is made with reference to western culture, not the religious teachings of Christianity and Judaism.

nity. It provides jobs to the community's members and, in turn, benefits from such local infrastructure as schools for its employees' children and electric and water utilities. As a good neighbor, a firm bears some of the responsibility for educating the local people.

In many contemporary Muslim communities, the illiteracy rate is very high. The pool of potential employees for local businesses is therefore full of uneducated people. If hired, such people would have little understanding of the firm's productivity and financial health or of the quality of its products. Their ability to handle complicated tasks would also be limited, which would force the business to spend a great deal of money on training costs. It is therefore essential that businesses actively participate in mass education programs, either through contributing to the government's attempts to develop indigenous infrastructure or through funding local schools. Even in-house programs for employees would contribute to an increase in knowledge.

General Education of Workers. An individual's educational background affects the type and quality of the work he/she can perform. A better educated worker can handle more complicated jobs and learns more quickly. Education becomes particularly critical as work becomes information-based and less agricultural. The importance of general education is the subject of the very first revelation of the Qur'an:

> Read in the name of thy Lord Who created—created man from a clot. Recite, for thy Lord is Most Honorable, Who has taught by the pen, Who taught man what he knew not. (96:1-5)

The Qur'an, which stresses both reading and writing, speaks in this regard about the Lord of Honor. It implies that an individual can attain honor by reading and writing. This interpretation is strengthened by the verse: "Allah will exalt in rank those of you who believe and those to whom knowledge is given" (58:112). The importance of gaining knowledge is also stressed: "Say, Lord increase me in knowledge" (20:114) and "Whoever is given knowledge is given indeed abundant wealth" (2:269).

There are several prophetic *ahādīth* that emphasize the initial and the continued acquisition of knowledge. The Prophet once said: "The acquisition of knowledge is the duty of every Muslim man and woman, even if they have to go to China." At that time, China was considered a remote country that could only be reached by means of uncomfortable and hazardous travel. His words indicate that people should go to great lengths to acquire knowledge. On another occasion, the Prophet said: "One of the signs of the Hour [the doom of a nation or an individual] is that knowledge shall be taken away and ignorance shall reign supreme" (Ali n.d.).

Researchers in the West agree that the lack of knowledge among the masses is a dangerous situation. The National Commission on Excellence in Education, appointed by former president Reagan, commented on the seriousness of adult illiteracy in the United States by titling its report *A Nation at Risk*. The commission concluded

its report by saying that the future welfare of the nation is "in peril" (National Commission 1983).

Based upon the above analysis from the point of view of Islam, as well as the concern expressed by contemporary scholars, there is only one conclusion that can be drawn: the continual acquisition of knowledge is essential for the continued spiritual and material development of a nation.

There is another practical reason why firms should participate in educating their workers: the need to convey information about their activities, plans, policies, and operating procedures. This can be done in a cost-effective manner through the publication of newsletters. If many workers are illiterate, such a strategy would not be suitable. In this case, the firm could decide not to pass on any information to their workers. However, this would ultimately lead to the spreading of rumors which, in the long run, are harmful to both management and workers. Furthermore, ignorance of relevant procedures and policies contributes to accidents in the workplace, low quality products, and poor customer service.

The second possibility is to use more expensive methods. An example of this situation is provided by the United States Department of Defense. Due to the low level of literacy among some recruits, it had to spend thousands of dollars to convert its weapons manuals into easy-to-read comic books for those who would one day be expected to handle complicated equipment (Briggs 1987).

Cooperative Educational Development. As a general rule, firms are not in the business of teaching. However, Islam motivates them to get involved in this noble work by requiring Muslims to help each other develop to their fullest potential. In one prophetic hadith, it is reported that the Prophet said: "A Muslim owes a Muslim six duties to be bestowed liberally . . . and he should love for him what he loves for himself" (al Tirmidhī, as quoted in *Mishkāt al Masābih* 24:1). Everybody would agree that for oneself one desires success and happiness. This hadith suggests that in an Islamic society, people should not only work to enhance their own welfare but also the welfare of their fellow Muslims. A firm can encourage its workers to improve their literacy skills by pairing literate workers with their illiterate coworkers on a voluntary basis. Such programs may even be associated with such nonmonetary incentives as the election of an "educator-worker" of the month.

Nevertheless, monetary incentives are not un-Islamic. States could pitch in and provide such incentives. Tax shelters could be provided to those people who teach other Muslims. In the early period of Islam, the Prophet agreed to accept the implied wages earned by non-Muslim prisoners of war in teaching Muslims as ransom money to win their freedom. Similarly, 'Umar ibn al Khattāb remitted the *jizyah* payments for those non-Muslims who taught illiterate Muslims. However, the success of such programs is generally more dependent upon the commitment of individuals than the nature of the incentives.

Personnel and Production Functions

Staffing. Firms hire workers for specific tasks. Workers who have been educated properly and who have an appropriate attitude can make the difference between an enterprise's success or failure. Marshall (1986) has observed that "developed, educated, motivated people are an unlimited resource . . . [while] undeveloped, uneducated, unmotivated people are a monumental drag on an economy in the internationalized information era." The personnel staff matches the job specifications with the applicants' abilities. The selection procedure is supposed to eliminate those who are, for one reason or another, relatively less desirable workers in terms of productivity and behavioral aspects. Two verses provide excellent guidance for those dealing with staffing considerations: "Allah commands you to make over the trusts to those best fitted to discharge them and that when you judge between the people, you do so with justice" (4:58) and "For the best man you can hire is the one who is strong and faithful" (28:26). Thus God says that the best and most trustworthy applicants are to be hired. Implementing such a program will minimize training costs, maximize productivity, and ensure that relevant talent will not be wasted.

An employer must also be conscious of the fact that not all people are the same, just as all raw materials are not the same. For example, it is easy to use steel and copper to manufacture weapons, whereas the use of wax for the manufacture of such goods may be possible but would require a lot of research and effort and would perhaps be wasteful. It is easier and more cost-effective to use materials for the purposes for which they are best endowed by nature or training.

Islam recognizes this difference in the capacities and talents by limiting the choice to the best and the faithful. However, it has connotations for such programs as equal employment opportunity and affirmative action. These verses definitely discourage the selection of workers on the basis of race, sex, religion, and national origin. Nevertheless, given the fact that previous policies of official neglect and injustice have been applied to certain groups, with the consequent result that such groups have been prevented from taking full advantage of educational, intellectual, and social developments, a way must be found to make amends.

However, the use of an explicit or implicit quota system and the policy of affirmative action, as currently practiced in some Muslim and non-Muslim countries, are not right approaches, for they result in hiring employees who might not satisfy the Qur'anic requirements. A better approach would be a two-tier employment system. In the first tier would be the employees best qualified for the job. In the second tier would be those trainees selected from the less-developed groups. Members of this group should compete with future job applicants at a later date. Funding for such training should be provided, either directly or indirectly, by the state or through subsidies to firms participating in the program.

Job Specialization for Men and Women. This area needs careful consideration. Women in most societies have not been allowed to contribute to national progress.

This has resulted in the promulgation of "equal opportunity" and "affirmative action" policies. To develop appropriate personnel policies, Muslim nations must follow the relevant Qur'anic guidelines. For instance, the job must be offered to the most suitable person. In business, suitability implies improvement in cost, quality, reliability, and productivity consequent to hiring the employee.

Any environmental constraints placed on an employee should also be taken into consideration. In the case of women, Islam tells men to threat them with respect and restraint. It requires men to lower their gaze when approaching women and also requires women to dress modestly. These are the only restrictions Islam imposes on the employment of women.

However, as Muslim countries are in the initial stages of development, they must follow policies that will enable them to become competitive with other nations as quickly as possible. In areas of employment where women excel men, they should be preferred. The same is true for men. In areas where superiority based on gender is not apparent, both sexes should be given an equal opportunity.

Women are a vital human resource that should not be neglected. They must be allowed to contribute fully to their country's national development. However, Muslims should learn from the epereince of the West and its policy of free mixing of the sexes on the job. Qur'anic guidelines in this area must be enforced. In addition, very strict laws designed to curb sexual harrassment must be devised and their implementation ensured.

Wage Setting. One's wage is a reward for work done. A fair wage will encourage workers to put in their best efforts, whereas an unfair wage may lower worker morale and ultimately lead to strikes. The best wage rate is the one which takes into consideration job requirements and the varying productivity of workers. This can be seen in the following verse:

> Covet not that whereby Allah has made some of you excel others. Men shall have a share of that which they earn, and women shall have a share of that which they earn. Ask Allah alone of His bounty. Surely Allah has perfect knowledge of all. (4:32)

This verse states the basic principle regarding wage setting: men and women are to be paid according to their productivity. Wages are independent of the worker's sex, race, religion, or any other characteristic.

The current economic rationale of wages is based on the principle of the marginal productivity of workers. An additional worker is hired (or a current worker is retained) as long as the marginal productivity is greater than the marginal wage. This principle results in the long-term financial viability of a firm.

A number of Muslim economists, for example Khan (1981), criticize this principle by expressing doubt as to whether it is in accordance with the Islamic teachings of *ukhūwwah*, *ta'āwun*, and *ihsān*. Its application in a time of slack

markets will hurt workers. Employers' efforts to retain workers during short economic downturns conform to Islamic teachings as well as to the concept of marginal productivity. Laying off workers for very short periods can result not only in their economic dislocation, but also in increased restart costs and a loss of trained workers. However, if there is a long-term reduction in the demand for the product/service, to retain a worker is neither in line with Islamic teachings nor with the marginal productivity principle. The concept of *iḥsān*, however, suggests that workers be given a sufficiently advanced notice of layoff. Also, they should be retrained if they have the requisite knowledge and motivation for other available jobs within the firm.

The Islamic teaching of hiring the best available worker and paying wages according to his/her production should not be ignored; otherwise, the firm's long-term survival will be jeopardized by the uncompetitive nature of its operations. Thus the critics view the employee-employer relationship, as described by the principle of marginal productivity and marginal wages, as not sustainable and worthy of re-examination. Nonetheless, Islam teaches the care of workers who are laid off due to a depressed economy or some form of disability.

> But it is righteousness to believe in Allah . . . To spend of your substance out of love for Him, for your kin, for orphans, for the needy, for the wayfarer, for those who ask, and for the ransom of slaves. (2:177)

The above verse clearly places the responsibility of maintaining laid-off (needy) workers on the community, not just on the employer. It is a common practice among western nations to provide unemployment benefits for a limited period to workers who are temporarily out of work. This practice could be slightly modified to conform to Islamic norms. For example, unemployed workers should receive benefits for an unlimited period,[3] and their society should require them to engage in some sort of social or community work (i.e., helping senior citizens or undertaking tasks in schools that cannot be carried out due to budget shortages). It is common knowledge that many individuals misuse unemployment benefit policies, since the benefits for not working are more palatable than for working. This is neither Islamic nor in the best long-term interest of the individual. Requiring the unemployed to work will enhance their self-esteem and also help some sectors escape the pains of budgetary woes.

Worker Participation in Management. In reality, workers are partners in any business. To a greater or lesser degree, they are either direct or indirect owners of their company's shares. While in some cases they hold these shares on their own ac-

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[3]This does not contradict the principle of marginal productivity, because unemployment benefits will be paid by the state, not the firm.

count, it is more common for them to do so through such company-sponsored programs as pension plans and stock options (Scholes 1991). In addition to human capital, they provide short-term financing, as they are paid at weekly, biweekly, or monthly intervals for their production. These delayed payments represent accruals that firms use to finance their short-term needs. There is no cost to the firms for using these funds, for no returns are paid to workers. Firms can reduce their short-term financial costs simply by extending the pay period.

However, according to one hadith, a worker should be paid before his/her sweat dries. Another hadith implies that wages not paid to workers after the completion of the day's work should be invested and that the investment and returns be returned to the worker on his/her demand.

Current textbooks on corporate finance, such as Brigham (1990) and Gitman (1991), consider accrued wages as short-term funds provided by workers to the firm. Since these funds are an investment, they must generate a rate of return. Also, if these funds are to be considered as an investment made by the firm's workers, they are actual partners and deserve to be treated as such.

The Islamic view of workers as partners is now being applied by many progressive businesses. Several methods to involve workers in the management of firms have been devised. Two examples are Employee Stock Ownership Plans (ESOPs) and membership of workers on the firm's board of directors. The effectiveness of the ESOPs in the United States is indicated by the fact that in 1988, more than 10 million workers and 10 thousand companies were covered by them, figures that represent increases, over a ten-year period, of 260 percent and 150 percent respectively. Current research shows that these methods are highly beneficial for both firms and employees. Productivity has increased, workers are happier at their workplace, and customer satisfaction has improved (Henry 1989).

If workers are to be considered genuine partners, they should be allowed to participate effectively in the management of the business. For this, they have to be knowledgeable enough to contribute to the formulation of the firm's strategy and understand the philosophy behind managerial actions to avoid any mistrust. Currently, companies in the West permit workers to participate in management, but provide no training to help them participate effectively (this violates Islamic norms). Muslim countries, in their quest to improve the quality of human resources, should encourage participative management and provide basic conceptual training for this function. In addition to training workers for specific job management, they should be trained in the basics of investment. This will enable employees, who have equity participation in the firm, to steer the firm's future investment activities in a productive and safe direction.

Health Care. The physical health of workers mainly depends upon the food they eat and their working conditions. Current statistics about worker health, even in the wealthy western nations, are very disappointing. According to various surveys, about 30 to 40 million Americans do not have access to health insurance. A recent Rand

Corporation report reveals that accidents cost the United States $176 billion annually. Assaults, drug abuse, unsafe sex, and unintentional injuries cost additional billions of dollars each year. An application of Islamic principles could ameliorate this situation. The Prophet exhorted employers and masters to take care of those who are in their charge. He once said to Abū Dharr:

> Your slaves are your brethren. Allah has placed them under your control: so whoever has his/her brother under his/her control should feed him from what he eats and should give him clothes to wear from what he wears, and do not impose on them a task which should overpower them, and if you impose on them such a task then help them in doing it.

This hadith requires employers to feed and clothe their workers in the best possible way. This will result in physically and mentally healthy workers. In addition, the Prophet tells employers not to impose stressful working conditions upon workers. Work that overpowers workers causes work-related stress, which gives rise to poor morale, workplace accidents, and lower productivity. Many white-collar workers in the United States have taken to drinking and using drugs because of excessive work loads.

Current western research also shows that the health of workers should be one of the firm's top priorities. In a recent study published in the *Journal of the American Medical Association*, it was reported that a firm offering counseling to its workers on appropriate nutrition, weight loss, and smoking cessation saw a 75 percent reduction in claims paid regarding cardiovascular disease and a 78 percent drop in total health-care claims paid (*Prevention* 1991). No doubt there are initial costs associated with such programs, but they pay off amply in the end. The study quoted above indicates that for each dollar of investment in this program the savings range from $1.89 to $2.72. These savings arise from boosted morale, lowered absenteeism, better health, and improved productivity.

Quality Control and Quality Consciousness. Islam lays great stress upon the quality of the goods sold. One important aspect of quality control in a manufacturing process is the weight and the characteristics of the product in its package. A Qur'anic verse dealing with one of these aspects of quality is: "Give a full measure when you measure out and weigh with a true balance; that is most commendable at the end" (17:35).

In the present circumstances both the domestic and international competition has made it essential that firms ensure the quality of their products or else they will lose their market share. For example, American companies have lost a significant portion of their erstwhile market share to the Japanese and the Germans due to their lackadaisical attitude towards quality during the 1960s and 1970s.

Based on Islamic teachings and the current validity of these ideas, as shown by the shifting market share of nations, Muslim countries must develop their human re-

sources in this sphere. In order to create quality-consciousness among workers and managers, firms should design appropriate plans and policies. However, it should be kept in mind that Islam does not insist upon excellence in quality, for that may not be what the customer is willing to pay for. It simply demands that the customer should be aware of the quality of the item being purchased and that he/she should examine it carefully, as evidenced by the following hadith: "The Messenger of Allah forbade *munābadhah* (throwing the person his/her cloth in sale to another before he/she had examined it or looked at it) and forbade *mulāmasah* (touching of a cloth without looking at it)."

The first part of the hadith requires the seller to let the buyer inspect the product being sold, while the last part shows that the Prophet stressed that the customer should check its quality carefully. However, the Prophet did not leave the matter of the product's quality to the buyer alone. He wanted the seller, who generally has a better knowledge of the product's quality, to show it to buyer willingly. He indicated this by his own behavior. One day when he was in the market, the Prophet saw a man selling a heap of corn. He put his hand into the corn and found that the corn inside was wet, while the corn outside was dry. The seller told the Prophet that it had rained and that he had turned the inside of the heap out. The Prophet responded that he should have left the corn as it was (i.e., the wet corn on the outside) so that the buyer would know its condition.

Current mass production techniques often require firms to advertise certain product characteristics, and customers must rely on these claims. For example the quality of an automobile, the potency of a particular medicine, and the weight of cereals in a carton cannot be checked by a customer while making purchases. It is also not possible for the manufacturers to check each and every unit produced.

There are two methods available to manufacturers to overcome these problems. One is that they follow zero-defect manufacturing procedures. This requires training production workers to make quality checks during the manufacturing process. The second is the application of Statistical Quality Control. Both of these methods are currently in vogue and have helped firms minimize the production of defective products. Firms in Muslim countries must stress such training and the application thereof. Not only will it help them carry out the teachings of Islam to win Allah's pleasure, but it will also enhance their competitiveness through greater customer satisfaction. These factors will also lead to their increased material welfare and technological advancement.

Islamic Economics vs. Traditional Economics

The application of traditional economics has not solved the economic problems of the modern world. The following quotation from the *Wall Street Journal* (27 June 1991) supports this contention:

> The Cold War is behind us. Communism is a failed experience. Around the world we see nothing but economic distress. Why is the U.S. in recession? Why are Canada, England, Australia and Sweden in recession? Most of Europe is suddenly struggling to stay on a growth track. Japan's stock market is in steady retreat and its dizzy economic growth has slowed. And how is it that so much poverty, unemployment, inflation and debt plague the Third World countries of Asia, Africa and Latin America?

The anticipated results of applying Islamic economic principles (IEPs) is not likely to be an automatic cure-all. Timur Kuran (1989) has expressed strong concerns about the applicability and the outcome of IEPs. He cites discord among Islamic economists on interpretations of such basic concepts as justice and equality. He also cites innumerable examples of disastrous outcomes of applying these principles (i.e., zakah collection in Pakistan, Malaysia, and Sudan). He even fears that the push to enforce IEPs may end up with the Muslim world being governed by inefficient zealots and tyrants.

Such concerns cannot and should not be dismissed lightly. Research needs to be conducted into the interpretation of Islamic principles. Are these differences so vital that they effectively rule out the applicability of Islamic economics, or are these such that different interpretations are likely to create trivial marginal results? Empirical research should also be undertaken to ascertain why various Muslim economies have failed to respond to the application of IEPs. From my experience of having lived in both Muslim and non-Muslin economies, I am almost certain that the reason for the lack of response of Muslim economies to the application of IEPs is the fraud, inefficiency, and nepotism of the influential sectors (i.e., the bureaucratic and political institutions). Just as bad money chases out good money from an economy and interest-free banks fail to perform well in competition with traditional banks, the same applies to the total economic environment.

People by nature are greedy, as the Qur'an states very clearly: "The mind of man is ever ready to incite to evil" (12:54). An untrained and unregulated mind opposes humanity's attempts to attain moral perfection and urges individuals towards undesirable and evil ways. Unless religious education and training is universally provided, and a system of rewards and punishment instituted to motivate people to adhere to the principles of justice, self sacrifice, and honesty, there is every possibility that the results of IEPs will be undermined.

This applies to IEPs as well as to traditional western economic principles. Western countries have found that without the backing of regulations, it is impossible to carry out economic activities smoothly. The expectation that IEPs will operate successfully without proper regulations is naive. However, the application of the Islamic laws of reward and punishment will be more acceptable to the masses, as shown currently by the ease with which the establishment of the Sharī'ah has been enacted by various Muslim countries. The real problem is the enforcement of its rules. This is where corruption among government officials and politicians has

created roadblocks. Favoritism limits the implementation of strict code. Whereas the Prophet said, "Even if Fātimah, the daughter of the Prophet, steals, her hand will be severed," we have yet to find an example of such an undertaking against any of the influential thieves and thugs in the modern Muslim world.

These essentially macroenvironmental observations are equally applicable at the microlevel. If some employers, in the light of Islamic teachings, provide desirable benefits to workers and others do not, the problem of cost competitiveness could thwart the results of applying IEPs. In addition, there should be no sacred cows in the application or these rules. While management is expected to show a benevolent attitude towards workers, the latter are also required to observe honest working practices. Examples of dishonest work attitudes are theft of inventory and suboptimal production. Rewards and punishments in accordance with Islamic laws must be established, and mechanisms must be put in place to implement them before the expected results at the decision-making level can materialize. According to the principles of successful strategic management (David 1991), it is not enough to formulate right strategies: managers and employees must be motivated to implement them. This is where the Muslim state's and firm's efforts need to be concentrated.

Conclusions and Recommendations

In order to bring about the economic development of the Muslim world, the most vital element is the development of human resources. The principles and techniques required for this task are stated in the Qur'an and the hadith. Western practices have steadily gravitated towards Islamic teachings through trial and error. However, they have not fully succeeded in attaining the objective of committed, loyal, and dedicated employees.

One apparent reason is the western adherence to materialistic values and the consequent absence of the spiritual factor. Muslims fortunately attach great significance to the spiritual component. Due to this advantage, they are more likely to achieve their goal of economic growth and development. But they must start human resource development programs immediately. The highest priority should be given to general education of the masses. At the same time, firms should establish independent departments to develop and institute plans, policies, and methods designed to ensure the application of Islamic teachings with regards to various commercial practices, particularly in the area of personnel and production management. Additionally, decisions made at the firm level should be coordinated with national policies. National, regional, and local work ethics councils should be instituted and charged with the responsibility of training workers in productivity, quality control, and general work principles. Above all, universities, colleges, and schools should add a required course in religious studies to their curricula. Governments should establish rules and regulatory bodies to oversee the business sector's implementation of the relevant rules set forth in the Qur'an and the hadith.

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Human Development in the Context of Some Resource-Rich Education-Poor and Resource-Poor Education-Rich Developing Countries

by
Ataul Huq Pramanik

It is no wonder that the key to successful development has shifted the attention of policymakers and administrators from the West to the East. This shift was due to the acceptance, almost a priori, that development, as understood in terms of quantitative changes by western neoclassical thinkers, could not be achieved without the effective utilization of primarily capital resources joined with such natural resources as land, water, and minerals. Although technological improvement was embodied in the innovation and discovery of new products, and new ideas were emphasized by such economists as Schumpeter, Harrod, and Domar, the acceleration of productivity and, subsequently, of income in the shortest possible time, as well as the primacy of physical capital ("dead capital" in Marxist jargon) over active capital (implying man) remained unchallenged.

In addition, according to Henderson (1989), neoclassical economists were in constant danger of forgetting that "economic conditions are made for man, not man for economic conditions." In fact, human beings have been treated as a means or an object, rather than as a subject, of development efforts. The result is that, despite good growth (as measured by quantitative changes in such certain parameters as aggregate or per capita GNP), the vast majority of people were required to undergo the process of underdevelopment, which manifests itself in the extreme deprivation of material and nonmaterial needs, squalid conditions, less-than-desirable living conditions, and alienation from the privileged classes.

The exception to this deplorable human condition is found in those countries that have applied normative considerations when analyzing human behavior.[1] Among

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[1]Sen (1987, 1988) has explained how so-called positive economics has neglected the influence of ethical considerations in the characterization of actual human behavior. One can also consult United Nations Development Programme (1990) and Crocker (1991).

these countries, regardless of their ideological beliefs and stage of development, there is one commonality that emerges: the high priority placed on education from the very beginning of their development program. The development of human capital over the last three to four decades in such developing countries as China, South Korea, Malaysia, Indonesia, Thailand, Sri Lanka, Chile, Costa Rica, Jamaica, Tanzania, and Taiwan has ensured long-term sustainable growth despite their initial poor command over physical capital (Tang and Worley 1988; Solow 1988). The externality effect, which was created by human capital formation, managed to overcome the financial and natural resource constraints. In other countries, a different process was seen. For example, Pakistan, Bangladesh, and Nigeria all placed high priority on physical capital at the outset, but the resulting development failed to generate any externality effects due to poor human capital formation. Other resource-rich countries (i.e., Oman, Gabon, Saudi Arabia, Algeria, Mauritania, Senegal, Cameroon, and the United Arab Emirates) have been unable to translate their income into human progress.

The development experiences hinted at above do not, however, suggest that the better-performing countries were also successful in guaranteeing those material as well as basic and nonmaterial needs (i.e., political rights, civil liberties, and personal freedom) that are closely associated with human development. What performance really means is that some countries, through the process of imparting education to all citizens, succeeded in realizing the most crucial prerequisite of human development: they were able to free the vast majority of the population from the pains of hunger and, as such, from exploitation by others.

Having made these observations, the hypotheses tested in this study are: a) Human capital development through formal and informal education is a necessary and a sufficient condition for sustained economic development, and b) Economic development without ethical, moral, and spiritual development, despite any reduction in human deprivation, increases human distress and weakens the social fabric.

The Development of a Human Being: Its Importance and Preconditions

All religious and philosophical traditions treat man as a unique being in nature (ALIRAN 1991). As such, a human being is not only endowed with different capabilities that are not possessed by the other beings (i.e., animals), but also has the ability to choose what he will and will not do. The importance of human beings is to be understood in terms of the responsibilities entrusted to them.

As a human being exists not just for himself, but for the whole community and for nature at large, it is necessary that he be guided by certain values. Therein lies the core of humanity, for it is the individual's spiritual, as opposed to his animal, nature that defines humanity. Being human therefore implies being spiritual. Toynbee's (1976) observation in this regard truly depicts the need for spiritually developed human beings, for only they can offer a cure to the sickness of modern society. This spirituality presupposes a balancing of the individual's interests with those of the

human community and with the interests of all other beings in nature. It means being caring as opposed to selfish, and practicing love and sacrifice as opposed to greed.

In order for man to fulfill these obligations through his own spiritual upliftment, existing social institutions must be guided by spiritual values. In other words, there should be no concentration of power in the political arena, justice must prevail in social relations, and man should live in harmony with all other living and non-living (i.e., inanimate) elements of creation. Therefore, promoting human development entails having a spiritual view of humanity and eradicating any man-made inequality and injustice found in human societies. It is evident, even in the writings of western scholars, that freedom and God are inseparable, for the consciousness of God is embodied in the consciousness of freedom. According to Jaspers (cited in Boisard 1979), there is a link between the denial of freedom and the denial of God. When a man is conscious of his freedom, he is at once convinced of the existence of God.

Having accepted the interrelationship between the need for freedom and the need for God, we can understand the different positive and negative elements of freedom (i.e., freedom from hunger, malnutrition, escapable morbidity, ignorance [the ability to read, write, and communicate], oppression or exploitation, and being able to exercise political rights and civil liberties as well as to accept or reject both on material and moral grounds).[2] Some of these elements are mutually inclusive rather than exclusive. For example, freedom from hunger is likely to ensure freedom from morbidity, and the freedom to read and write may ensure freedom from ignorance, prejudice, and exploitation. Ensuring the freedom to acquire knowledge, skills, and training through education and expanding the capabilities and choices available to individuals (Sen 1988) is likely to free them from other bonds, including hunger.

At its most basic level, the above discussion can be summed up as an individual having the freedom to acquire knowledge (i.e., education) in order to understand the meaning of his existence. In other words, there must be social arrangements that make it possible for people to fulfill their material needs in juxtaposition to providing them with opportunities to enhance their own capabilities through the acquisition of knowledge. As the acquisition of knowledge through education is fundamental, the process, methods, and contents of education must be conducive to the development of a human being who can understand the true meaning of his existence. A meaningful education is one that teaches man not to serve anybody or anything other than God. Man must not be a means, for everything must serve him (Boisard 1979).

It is certainly true that knowledge gained through traditional education, regardless of discipline, extent, and content, has reduced man to the level of a self-interested producer and consumer. Knowledge based on traditional or secular educa-

[2]The positive view sees freedom not in terms of the presence or the absence of interference by others, but in terms of what a person actually is able to do or to be. The negative view sees freedom exclusively in terms of the independence of the individual from interference by others, including governments, institutions, and other persons. See Sen (1989).

tion and severed from knowledge revealed through Judaism, Christianity, and Islam has turned human beings into non-human beings by creating a one-sided and unidirectional man. Man has been so materially indoctrinated that education has prepared him only for different functions and not for broadening his horizons and freedom so that he can distinguish between his individual self and his social self.

The moral precepts found in the Qur'an (2:178) illustrate three types of relationships that must be present in a materially and spiritually developed human: a) man to God (seen in the religious beliefs and practices by being God-fearing and loyal); b) man to society (seen in the sacrifice made in terms of sharing one's fortune with the less fortunate); and c) man to self (seen in the process of self-discipline, including being steadfast, patient, firm, and trustworthy).

Implications of Human Development for Economic Development: Some Empirical Evidence

We will now examine the role of those elements that promote human development by fostering economic development (measured primarily in terms of material achievement). To substantiate empirically the above-stated relationship, we chose five (three Muslim-majority and two non-Muslim-majority) developing countries. The reasons for this selection are: a) they belong, more or less, to the same stage of development and, except for Bangladesh, they began their national development efforts in early 1950s; b) the official public policy of their governments, irrespective of resource availability, played a pivotal role in indigenous human capital formation in the context of the overall national development strategy; c) they showed commonality by adhering to their oriental value system rather than the Protestant work ethic; d) although they were not characterized by a totally closed economic system, as was China in the early 1950s, their pursuit of a western free-enterprise economic system characterized by self-interested behavior was equally absent; and e) differences in technological development were a matter of degree and not of kind.

In order to facilitate an interesting comparison, two education-rich and resource-poor countries (Sri Lanka and South Korea), an education-poor and resource-poor country (Bangladesh), an education-poor and resource-rich country (Nigeria), and an education-rich and resource-rich country (Malaysia) are considered.

The Relationship between Material Development and Resource Availability. Having recognized a great deal of commonality and with very little diversity, the ability of three of the five countries studied to achieve long-term sustainable growth in per capita GNP terms of more than 3 percent for twenty-five years is no mean achievement (Table 1). Any attempt to explain the spectacular performances of Sri Lanka, Malaysia, and South Korea cannot be substantiated by the availability of nonhuman primary resources measured in terms of per capita arable land of export earnings from fuels used as a proxies for mineral resource stocks. Empirical observations

based on Table 1 suggest that whereas Bangladesh, Sri Lanka, and South Korea began their development programs from a roughly similar resource base, the achievements over last three decades are outstanding only in South Korea and Malaysia: an increase it per capita GNP by a multiple of twenty-nine for South Korea, of eight for Malaysia, and of three for Sri Lanka (since the mid-1960s). The relevant increases for Bangladesh and Nigeria are quite modest: a multiple of around three.

Table 1: Development Performance of the Countries under Study Based on Resource Availability and State of Development

Country	Per Capita GNP Growth Rate			Annual Rate of Inflation		Availability of Non-Human Resources		Stage of Dev. GNP Per Capita (US$)	
						Per Head Arable Land (Hectares)	Av. Export Earnings from Fuel (Mil. US$)		
	1965-80	1980-87	1965-89	1965-80	1980-87	1984-86	1980-88	1965	1989
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9
Failed Cases:									
Bangladesh	-.03	.8	.4	14.8	11.1 (10.6)	.08 (8369)	13	72 (59)	180 (3,05)
Nigeria	4.2	-4.7	.2	14.7	10.1 (14.2)	.45 (1201)	11708	77 (65)	250 (3,85)
Success Cases:									
Sri Lanka	2.8	3.0	3	9.4	11.8 (10.9)	.14 (2659)	110	160 (151)	430 (2,85)
Malaysia	4.7	1.1	4	4.9	1.1 (1.5)	.25 (516)	3739	307 (270)	2160 (8,00)
South Korea	7.3	7.3	7	18.4	5 (5)	.05 (4404)	523	105 (153)	4400 (2876)

Sources: UNDP *Report* (1990), *World Development Report* (various issues), *World Table* (various issues). The figures in column 6 indicate population density per one thousand hectares in 1988. The figures in parentheses in column 8 are for 1960, while those in column 9 show the percentage increase in per capita income of 1989 over 1965.

Sociopolitical stability, which is highly contingent upon maintaining price stability and can be illustrated by a low inflation rate, also progressed hand-in-hand with long-term sustainable development in these three success cases. The relatively higher inflation rates in South Korea during the 1980s (due to extremely fast growth) and in Sri Lanka (due to civil disorder related to demands for ethnic autonomy) are quite understandable. Contrary to this, Bangladesh's and Nigeria's long-term sustainable growth of less than .5 percent, as well as their rather high inflation rates despite bearish economies, contributed to their highly unstable sociopolitical structures during the last three decades.[3]

The Relationship between Material Development and Human Development. The assertion that material development is a necessary, but not a sufficient, condition for promoting human development (as understood in terms of three sets of complex criteria: longevity, literacy, and command over resources) is evident from available empirical observations. The ability to expand resources (in terms of real purchasing power) accompanied by an appropriate policy mix of development (based on distributive justice) has contributed towards reducing human deprivation and enhancing human development in the three success cases. There does not seem to be an automatic relationship between material development and human development. If this were the case, resource-poor Sri Lanka could not have achieved the level of human development of Malaysia and South Korea, both of which had much higher levels of per capita income. This is evident from the data presented in Table 2.

Relationship between Freedom and Human Development. Freedom and development, both of which are meant for human beings, are highly interdependent. There is almost no separation between them. But once freedom is divided into either elementary and fundamental or positive and negative categories, it becomes easier to see a causal relationship between positive freedom and human development.

Furthermore, it is obvious that the secular concept of freedom, as measured by the presence of political rights, civil liberties, and the status of freedom, is not a precondition for ensuring the most fundamental freedom: the freedom from hunger. Of the three success cases, Malaysia and South Korea hardly enjoyed full freedom from the early 1970s until the mid-1980s. This is not, however, a denial of the long-term importance of political rights and civil liberties as regards the unleashing of human capabilities, creativity, and innovation or in the promotion of human development. Sri Lanka provides a good example in this regard.

With the exception of Sri Lanka, the status of freedom enjoyed by the citizens of the remaining four countries hardly differs (Gastil 1986). Despite their enjoyment

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[3]Frequent military coup attempts and political assasinations support this view. Ever since 1960, the military forces of both countries have been in power with only limited interruption. For more information, see Gastil (1986).

Table 2: Human Development in the Countries under Study

Country	Life Expectancy at Birth (years)			Under 5 Mortality Rate (per 1000)		Adult Literacy Rate (%) 1970-90		Averages of Deprivations	Human Development Index
	1960	1975	1987	1960	1988	Earlier Year	Latest Year		
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9
Failed Cases:									
Bangladesh	40	46	52	262	188	24	35	.682	.318
Nigeria	40	46	51	318	174	25	51	.678	.322
Success Cases:									
Sri Lanka	62	66	71	113	43	77	88	.211	.789
Malaysia	54	64	70	106	32	60	78	.200	.800
South Korea	54	64	70	120	33	88	96	.097	.903

Source: UNDP (various issues; 1992).

of similar statuses of freedom for quite some time, Malaysia and South Korea have been successful in achieving higher levels of human development, while Bangladesh and Nigeria have failed disastrously. Here, perhaps, lies the role of the ethically-loaded rule-based behavior of the East as compared to the ethically-free self-interested behavior of the West. In addition, when racial and cultural homogeneity are linked to a favorable world environment that brings about an outward-looking strategy, one can better explain the spectacular performance of South Korea as compared to that of Malaysia and Sri Lanka (Tang and Worley 1988; Young 1991).

Implications of Education for Human Development

Earlier in this paper, we referred to the overriding importance of the Qur'anic statement depicting the three-way relationship of man to God, man to society, and man to self in the context of the three elements of common good (i.e., redistribution, authority, and intrinsic morality) that fit quite well into the Qur'anic framework. We will now examine the successful and the failed cases.

Sri Lanka, Malaysia, and South Korea hardly diverge when it comes to their respective governments' commitment to strengthening the positive elements of free-

dom. This commitment, undertaken at the beginning of their national development efforts, has sought to establish a social environment capable of creating a caring society. The most interesting aspect of this observation is that, in every case, the national development strategy was based on participation and not on alienation (Goulet 1989). By placing higher priority on education, each government successfully gained the confidence of its citizens, even when certain fundamental rights (i.e., political rights and civil liberties) had to be compromised (Gastil 1986). In the failed cases, it was the misdirection of priorities, not the promotion of human development through the spread of education, that caused the governments' failure to gain the confidence of their citizens when faced with the need to engage in authoritative decision making. This explains why even the reformist policies pursued by undemocratic governments were challenged constantly.[4]

Redistribution, the second most important element of the common good, either in terms of implementing effective social security system (i.e., Malaysia and Sri Lanka) or of redistributing such assets (Gunatilleko 1983; Snodgrass 1980; Dorner 1972) as land (i.e., South Korea and Sri Lanka), worked quite well in the success cases but failed disastrously in the failed cases. An intrinsic morality (Maritain 1971), is the third element of common good. This morality, which played a stronger role in the success cases than in the failed cases, is not merely a set of advantages and conveniences, but is, in its essence, the integrity of life as well as the good and righteous human life of magnanimity embedded in the concept of self-discipline.

The obvious question now arises: Why has the Islamic value system, despite having all that is needed for attaining a balance between material and spiritual development, failed (Hussein 1988; Naqvi 1981; Ahmad 1980; AbūSulaymān 1985), despite a few exceptions, to promote material development and social justice by imbibing the spirit of the common good? Perhaps the answer does not lie with the dynamics of a particular value system, the majority of which are accepted by believers in the three Abrahamic faiths as well as by those who believe in Buddhism or Confucianism. What seems to be important is the presence of a good and authoritative, but committed, government that has the confidence of its subjects when faced with the need to implement certain policies. This ability is a result of the priority placed on human development, particularly the positive elements of freedom, and plays a very pivotal role. Thus good government and the universally acceptable elements of a value system, regardless of the existence of a divine or nondivine religion, act as mutual reinforcers and a catalyst for human development via material development.

We have talked a great deal about the acquisition of knowledge through education and its subsequent role in ensuring human development in the cases of Sri

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[4]In the case of Bangladesh, the education reform of president Ayub Khan in the early 1960s, the canal irrigation project of president Zia-ur-Rahman in the late 1970s, and the upazilla (lit. small district) decentralization system of president H. M. Ershad refer to this. In the case of Nigeria, president Buhari's policy of self-reliance, designed to reduce aid dependency during the mid-1908s, also was not given a fair trial.

Lanka, Malaysia, and South Korea (The Islamic Academy 1990, 1991; Al-Attas 1980; Husain and Ashraf 1979; Hussain 1988). But the knowledge acquired, if severed from the divine knowledge found in the Qur'an, is likely to contribute to more human distress when measured in terms of family and social integration. Human development based on acquired knowledge, when measured by the yardstick of combined primary and secondary enrollment ratios, is shown to have failed to halt the human distress and social disintegration illustrated by various social, moral, and ethical crises (see Table 3, columns 1-6). The underlying reasons for the moral degradation now being felt by the so-called high achievers in the material aspects speak in favor of realizing the importance of, and the prerequisites for, simultaneous ethical, moral, and spiritual development and material development.

Table 3 : The Magnitude of Human Distress and Social Disintegration

Category of Country	DR 1985-87	ACS 1980-85	RP 1980-85	PR 1980-85	S 1987-88	IH 1987-88	GHI 1988-89	CP-SER
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8
a. Industrial Developing World	4.6	3.9	48	205	16	4.2	3.5	81^p
b. OECD	4.5	3.6	51	186	14.6	3.8	3.6	)
c. Eastern Europe and USSR	4.8	4.4	-	-	18.8	4.9	3.1	) 100^q
d. North America	7.7	4.1	106	426	13.2	8.3	5.3	)

Notes and Sources: DR = Divorce Rate of Poulation (%) age 25+; ACS = Adult Consumption of Spirits per capita (liters); RP = Reported Rapes per 100,000 women aged 15-59; PR = Prisoners per 100,000 people; S = Suicides per 100,000 people; IH = International Homicides per 100,000 people; GHI = Greenhouse Index (carbon heating equivalents per capita); CPSER = Combined Primary and Secondary Enrollment Ratio (%); p = Middle Income Countries; and q = Industrial Countries. Based on UNDP (1991), pp. 175-6.

For the development of a balanced human being, the religion that regulates man's relationship with God is a must. This includes man's acceptance of the basic articles of faith that serve as the base of all Islamic religious activity as well as prayer, which, according to the Qur'an, restrains him from indecency and detestable acts and draws him closer to God. We do not, however, want to enter into a debate as to why Islam, the last revealed religion, is to be accepted as superior to all others in terms of developing a balanced human being (al Fārūqī 1982; The Islamic Academy, 1990, 1991; Holton and Turner 1989) whose moral and spiritual power is strong enough to withstand the temptations inherent in choosing between good and evil, what is allowed and what is forbidden, and what is just and what is unjust.

It is not an easy task to quantify the level of moral and spiritual development that accompanied the success or the failure of these five countries in their quest for human development. But general observations, based on the highly developed western world (Table 3), seem to suggest that the human development made possible by the acquisition of materialistic (i.e., secular) knowledge, even in the presence of good governance, has resulted in a morally bankrupt society.

Conclusion

Judging by the negative consequences arising from empirical observation, even the success cases may not appear to be that much better off than the failed cases (Gunatilleke 1983; Hussain 1988; Kameel 1990). The so-called success cases still have a long way to go before they can be said to have satisfied the other unfulfilled elements of freedom as well as to be promoting moral and ethical values. However, by the yardstick of material possessions that calls for a decent standard of living within the confines of certain essential elements of elementary freedom promoting human development, the success cases merit consideration. Therefore this study suggests that no nation, regardless of the success it has achieved so far in terms of human development based on materialistically determined positive value judgments, can afford to neglect ethical, spiritual, and moral considerations in uplifting human beings (Myrdal 1989; Sen 1987). This is due to the fact that it is these three considerations that, when given their proper role in the development of human beings, may cause the individual to march successfully ahead and withstand the inevitable decadence, caused by the negative consequences of acquired knowledge, with little ethical and moral stigma.

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Human Resource Development and Economic Growth in a Capital-Poor Islamic Economy: The Case of Sudan

by
Osman Suliman

Introduction

Labor-rich but capital-poor Islamic countries have invested heavily in human resource development. However, because of the incompatibility of their economic (capital) and human capital growth, their knowledge-intensive production has been sluggish. The slow absorption of investable skills appears to have followed a slow growth curve in capital-intensive production, where the marginal product of labor approaches zero. Such arguments elucidate the importance of the notions of complementarity or substitutability between capital and labor. Essentially, the power of labor to innovate emanates from its ability to substitute (save) investable capital. As Murphy, Shleifer, and Vishney (1991), Stokey (1991), Romer (1990), and Nelson and Phelps (1966) point out, human capital helps to generate those new products or ideas that underlie technological progress and, hence, faster growth rates. Others, such as Becker, Murphy, and Tamura (1990) and Lucas (1988), discern some spill-over benefits resulting from an increase in the rate of return on human capital over some range. Barro (1991) established a model in which the growth rate of real per capita GDP is related positively to initial human capital. However, it should be pointed out that most of these models are intrinsically well-behaved neoclassical growth models that stipulate positive marginal products and diminishing returns to reproducible capital (See Solow 1956).

This paper envisages, both theoretically and empirically, the weak disposability and the ability of labor to initiate innovation. In general, neoclassical production functions are based on strong disposability, where the marginal product of an input can only approach zero asymptotically. The present paper employs a production function characterized by the weak disposability of labor, where the marginal product may become zero or even negative, a characteristic of surplus labor economies (Lewis 1954). For example, abundant anecdotal evidence can be drawn from capital-

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poor Islamic countries. In Sudan, where the size of the traditional (subsistence) sector is significant, labor can be suspected to be weakly disposable.[1] The empirical questions, then, are whether skilled labor (knowledge) is stimulative (complementary) to capital investment or not (a substitute?) and whether labor is truly weakly disposable. The profound implications embedded in these issues are, of course, far-reaching, particularly with respect to sectoral linkages, where the agricultural sector in the capital-poor but labor-rich country is mainly labor-intensive and manufacturing is capital-intensive (see Leamer 1984).

The following section sets up the theoretical model, which is followed by an examination of the model's empirical estimation, a presentation of the co-integration results, and some concluding remarks.

The Model

Consider an economy in which labor is weakly disposable. The economy has a significant subsistence sector and surplus labor persists. As such, the marginal product of labor can become zero, or even negative, and is generally below the average product (real income). Following Fare and Jansson (1974) and Aly and Grabowski (1984), we can specify a production function possessing a weak disposability of labor. An implicit, but realistic, assumption here is that skillful (educated) labor is such an insignificant component of the total labor force that its separation from the aggregate of weakly disposable labor is not important. That is, the accrual of skilled labor may not add significantly to total output.[2] To be clear, if the amount of total labor is L, and if we designate the amount of available capital stock by k, then the total output is X:

$$X = \lambda (k - \alpha L)^{1-\delta} L^{\delta} \text{ where } (k - \alpha L) > 0 \qquad (1)$$

for $(k - \alpha L) > 0$ to hold, λ and α are assumed to be positive. δ can be anywhere between zero and one, i.e., $0 < \delta < 1$. The marginal product of labor will then be:

$$X'(L) = \lambda \{ (1 - \delta)(k - \alpha L)^{-\delta} (-\alpha) L^{\delta} + \delta L^{\delta-1} (k - \alpha L)^{1-\delta} \} \qquad (2)$$

Let:

$$(1 - \delta)(k - \alpha L)^{-\delta} (-\alpha) L^{\delta} = \theta \qquad (3)$$

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[1]In Sudan, the traditional sector represents approximately 60 percent of the cultivated land. For more on this, see Suliman (1990) and Al-Ijaimi (1989).

[2]Note that the relative price of investable skills (the nominal value of education as a ratio of the nominal GDP) in a capital-poor economy is significantly higher than the relative price in a capital-rich economy.

and:

$$\delta L^{\delta-1} (k - \alpha L)^{1-\delta} = \gamma \tag{4}$$

Given the adduced values of λ, α, and δ, it is clear that θ is negative while γ is positive. Thus, with an initial positive marginal product of labor, i.e., $\delta > \theta$, the further addition of labor yields a higher θ and a lower γ. Asymptotically, therefore, the marginal product of labor is bound to approach zero and possibly a negative value.

To show whether economic growth will accrue to the economy from higher investments in human capital (skills), we respecify the static form of the production function, shown in equation (1), in a dynamic form, such that:

$$X = \lambda \, (k - \alpha L e^{\beta t})^{1-\delta} \, L^{\delta} \text{ where } (k - \alpha L e^{\beta t}) > 0 \tag{5}$$

where t = time, and β = a technology parameter that indicates the rate of substitutability of labor for capital. That is, it measures the extent of innovation that additional labor will bring. For example, a negative β may indicate the replacement of capital with equally efficient (skilled) labor. If β is positive, then capital is not being saved as a result of labor increments. In this case, the two inputs may be perceived as complementary. The question of whether capital and labor are substitutes, complementary, or independent is an empirical one that can be resolved by investigating the existence of causal inferences between them through co-integration. Theoretically, however, one can examine the resultant components of the dynamic marginal product ($\dot{x}$) derived from equation (5):

$$\dot{x} = \lambda \, \{ (1 - \delta) (k - \alpha L e^{\beta t})^{-\delta} (-\alpha e^{\beta t}) L^{\delta} + \delta L^{\delta-1} (k - \alpha L e^{\beta t})^{1-\delta} \} \gtrless 0 \tag{6}$$

Given that $\alpha > 0$, $\lambda > 0$, $0 < \delta < 1$, and $k - \alpha L e^{\beta t} > 0$, it is clear that θ' and γ', defined below, are negative and positive, respectively.[3] Let:

$$(1 - \delta) (k - \alpha L e^{\beta t})^{-\delta} (-\alpha e^{\beta t}) L^{\delta} = \theta' < 0 \tag{7}$$

and:

$$\delta L^{\delta-1} (k - \alpha L e^{\beta t})^{1-\delta} = \gamma' > 0 \tag{8}$$

$$\dot{x} < 0 \quad \theta' > \delta' \tag{9}$$

[3]Note that when $k - \alpha L e^{\beta t} < 0$, we run the risk that θ' would be a complex number if δ takes the form $1/n$.

$$\dot{x} > 0 \mid |\theta'| < \delta' \tag{10}$$

$$\dot{x} = 0 \mid |\theta'| = \delta' \tag{11}$$

As Appendix B shows, using L'Hôpital's rule we can show that a negative β illustrates that the value of θ' will diminish over time, indicating that before the marginal product of labor goes to zero, a higher labor usage is stimulative to capital saving or, in other words, that labor is substituting capital. Conversely, a positive β indicates that the value of θ' will grow exponentially, showing that the complementary labor is stimulative to more capital investment. In addition, a zero β value reveals that capital and labor are independent or have the same productivity.

In Figure I, it is shown that the Z-line (ridge line) represents the locus of points at which the marginal product of labor is zero (see Intriligator 1971) For a negative β, the isoquants will shift, over time, towards the labor axis. For a positive β, the isoquants will shift away from labor. In the limit, at point Z_L, labor is sufficiently skilled and completely replaces capital. Below the Z-line, the marginal product is positive (relevant region); if above, it is negative. The marginal product is zero at $Z_1, Z_2, Z_3, \ldots Z_L$. The lines from the origin explain that as labor becomes more innovative and replaces capital, the higher the zero points for the marginal product, i.e., the more time it takes for the marginal product of labor to go to zero. The reverse is also true. Note that, depending on the sign of the β parameter, labor (capital) utilization and capital (labor) saving will proceed concomitantly as long as the marginal product of labor is positive. That is, prospective employers behave as maximizers of expected utility.

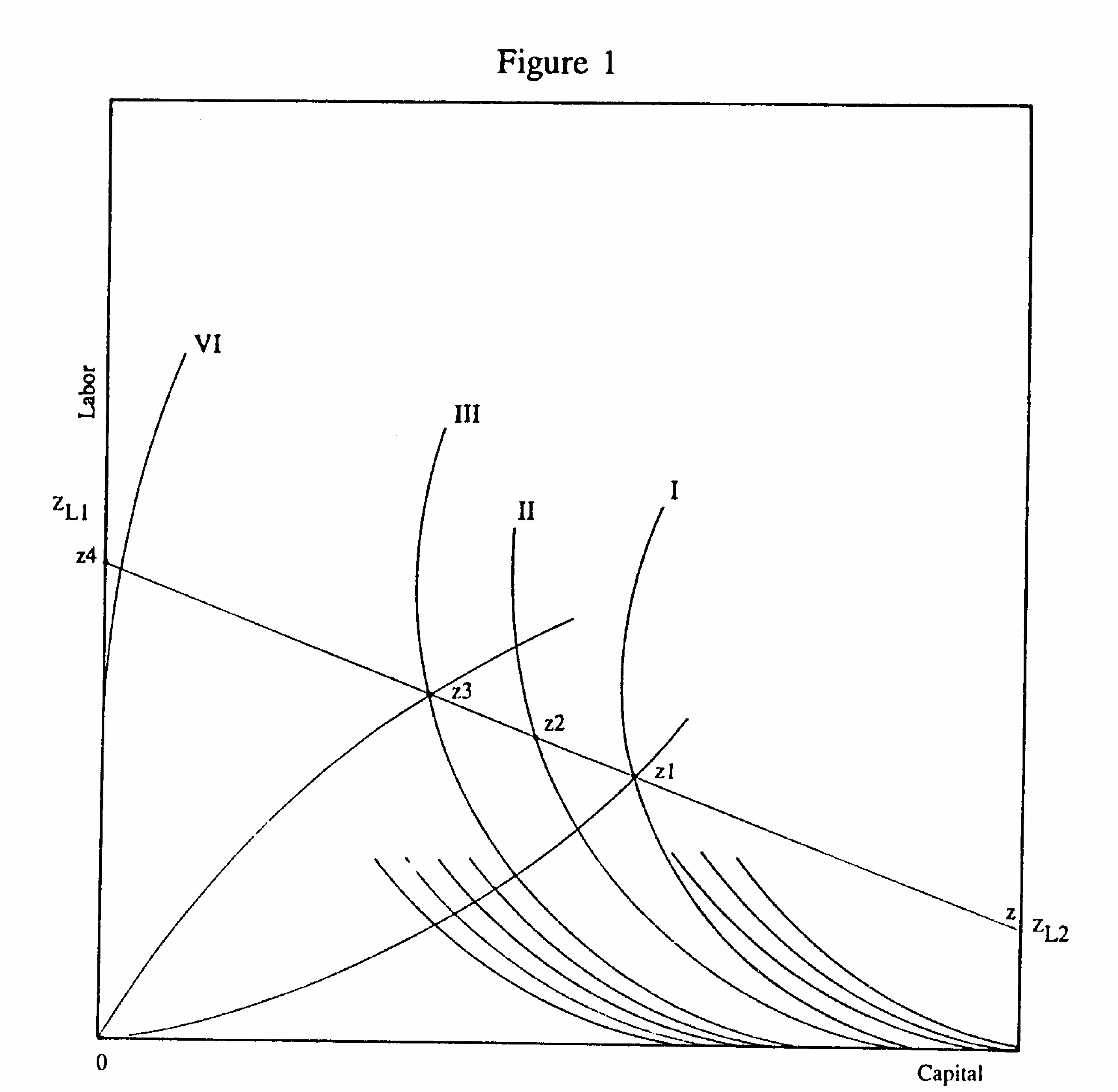
Another important point is that in a small economy (such as Sudan), capital is invested mainly in the manufacturing sector, while labor is used mostly in agriculture.[4] It follows, then, that a complementary relationship (β > 0), between labor and capital elucidates the use of agriculture as a service sector to the manufacturing sector, or that agriculture is meant to provide food and the ne-cessary savings for capital investments in manufacturing. On the other hand, if labor and capital interact as substitutes (β < 0), then agriculture is commercially competitive with manufacturing. Thus, as pointed out by Hymer and Resnick (1969), a substitution relationship suggests that even the most primitive economy has a variety of crops and agricultural techniques to choose from and that considerable flexibility in varying the amount of labor used can be acquired by varying the composition of output and the choice of technique (ibid.; Boserup 1965).

In a country like Sudan, where the manufacturing sector comprises less than 10 percent of GDP and where agriculture continues to be the mainstay of the economy, labor is expected to behave as a substitute to capital. Further empirical investigation using Sudanese data is, therefore, in order.

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[4]Skilled labor comprises less than 10 percent of the Sudanese labor force.

Figure 1



Empirical Methodology and Results

In the above theoretical discussion, it is suggested that a dynamic production function characterized by the weak disposability of labor takes the form presented in equation (5). An estimable form of equation (5) is:

$$X = \lambda (k - \alpha L e^{\beta t})^{1-\delta} L^{\delta} + \varepsilon_t \qquad (12)$$

where ε_t is an error term, and all parameters and variables are as defined before. Clearly, this model is intrinsically nonlinear, i.e., the model is nonlinear with respect to the variables as well as the parameters. In general, the parameters of an intrinsically nonlinear model may be obtained by setting up the likelihood function and finding the maximum likelihood estimates. However, the maximum likelihood method stipulates that the error term be distributed normally, an assumption from which I wish to abstract. As Kmenta (1986) points out, an alternative is to use the nonlinear least squares method. The obtained estimates are exactly the same as the maximum likelihood estimates whenever the maximization of the likelihood function is achieved by the minimization of the sum of squared deviations of the observed from the fitted values of the dependent variable (ibid). In addition, Judge et al. (1985) have shown that, even without the assumption of normality, the asymptotic distribution of the nonlinear least squares estimates is then normal and has the same mean and variance as the maximum likelihood estimates for the normality case (ibid.; Kmeta 1986). Moreover, when using the nonlinear least squares method, multicollinearity problems are minimized, because, when necessary, it uses ridge regression. The final results, however, do not involve ridge regression.

To use the nonlinear least squares method, we can take the logarithms to base e of both sides of equation (12):

$$\log X = \log \lambda + (1 - \delta) \log[k - \alpha L e^{\beta t}] + \delta \log L + \varepsilon_t \qquad (13)$$

The logarithmic form is convenient, since the estimated parameters can be directly translated into elasticities. In addition, the imposition of the logarithmic form on the equation will probably correct for possible heteroscedasticity in the error term.

Equation (10) represents the basic model estimated for Sudan according to annual data from 1960 to 1987.[5] Table 1 shows the empirical results. It is clear that

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[5]As shown in Appendix A, labor force data has been compiled from different sources. Due to the lack of data, population estimates provided by the IMF's *International Financial Statistics* served as a proxy for the total labor force. Thus, while the empirical results serve as an impetus for future research, they may have to be taken with caution. Skilled labor data are based on education statistics presented in the cited UNESCO publication (various issues). Capital data are given by the ratio of real gross investment (public and private) as a percentage of real GDP to represent the size of capital formation. The latter has been taken from Summers and Heston (1991).

the theoretical model fits the data reasonably well, as evidenced by the value of the adjusted R-squared (0.67). There is also no undue cause for concern about serial correlation according to the Durbin-Watson statistic as well as the Geary nonparametric test. In addition, the signs of the coefficients are consistent with a priori expectations. Virtually all variables are statistically significant.

The significant values and signs of α and β are noteworthy. The positive sign of α and its notable significance implies the weak disposability of labor. That is, the marginal product can be zero or negative. Of course, this can be further verified by substituting the values of the estimated parameters in the marginal product equation or equation (6) (see Appendix A). Moreover, the negative sign of β and its statistical significance show that labor and capital act as substitutes in Sudan. The extent of such substitution is, however, noticeably low, as indicated by the low value of β. This may suggest that the causal linkages between capital and labor are rather weak and thus cast doubt on the existence of any long-run causative relation between capital and labor. The next section endeavors to examine the long-run (co-integration) relationship between economic growth, labor, and capital.

Co-integration Results

To gain more insight into the complementarity or substitutability of capital and labor in Sudan, we can investigate whether these variables possess a long-run relationship (common trends). Recently, it has been demonstrated by Engle and Granger (1987) and Granger (1987), among others, that co-integration can be used to test for the presence of a long-run relationship among variables containing unit roots.

To test for the presence of unit roots, we regress the first difference of, for example, capital (investment) on its lagged value, in addition to a constant, a time trend, and a lagged dependent variable that will approximate short-run dynamics and yield white noise residuals. If the coefficient (of capital) is significant, then we reject the null hypothesis that the variable, in level form, contains a unit root. The test statistic is calculated by dividing the estimated coefficient by the standard error, and the critical values are modified t-values, as reported in Fuller (1976).

Each of the series was examined for the possible order of difference stationarity. As reported in Table 2, the null hypothesis of non-stationarity (unit roots availability) could not be rejected for the levels of capital, real GDP, and skilled labor. However, the cumulative labor force does not have unit roots.[6] The results are intuitively appealing. Economic growth (changes in real GDP), capital, and human capital (skilled labor) seem to possess common trends, whereas the cumulative labor force, which is predominantly unskilled, does not share any common trends with real GDP growth

[6]The calculated statistics for real GDP, capital, skilled labor, and total labor force are 5.99, 3.48, 3.04, and .53, respectively. The critical value is 3.0 at the 5 percent level and 2.63 at the 10 percent level.

and capital investment. The next step is to see whether or not real GDP, capital, and skilled labor have the same unit roots (co-integrated).

To test for co-integration, we regress the different variables against each other (plus a constant term). The resulting equation is called the co-integrating (equilibrium) regression. The absence (presence) of co-integration is indicated by the non-stationarity (stationarity) of the residuals. Engle and Yoo (1987) and Miller and Russek (1990) were followed in order to test the hypothesis of no co-integration. As such, a Dickney-Fuller test (DF), an augmented Dickney-Fuller test (ADF), and a modified Durbin-Watson test (DW) were performed.

The DF test requires regressing the first differences of the estimated residuals from the co-integrating regressions of their lagged values and then testing the significance of the estimated coefficients. The t-ratios are compared against the modified critical values reported by Engle and Yoo (1987). The ADF test adds to the DF test a lagged dependent variable to alleviate possible autocorrelation. For the DW test, the resulting DW statistics from the co-integration regressions are compared against some critical values given by Engle and Yoo (ibid.).

Except for the cases of capital investment and skilled labor, the three designated variables are co-integrated. As shown in Table 2, the tests could not accept the hypothesis of no co-integration for real GDP, capital, and skilled labor. However, no co-integration was found to exist between capital and human capital (skilled labor). The results suggest that the substitutability between labor and capital envisaged in the previous section is, at best, discernably weak.

Concluding Remarks

This paper examined labor's weak disposability and ability to innovate in a labor-rich but capital-poor economy. A production function possessing the characteristic of a weakly disposable labor has been theoretically derived and estimated empirically by using data from Sudan over the period 1960-87. As the model is intrin-sically nonlinear, the method of nonlinear least squares has been used to estimate the relevant parameters. The results are supportive of the notion of the weak disposability of labor. In addition, the empirical results suggest that there exists some weak evidence for the substitutability between labor and capital in Sudan. Furthermore, co-integration investigations for long-run equilibrium relationships between the respective variables are generally consistent with our theoretical and empirical findings. Finally, the results may have to be taken with caution, given the difficulties of compiling data for the labor force and the separation of skilled and unskilled labor.

Table I: Regression Results of Estimating Model (10)

Coefficient	Estimate	t-statistic
λ	160.992	3.833
α	15.981	3.640
β	-0.001	-3.440
δ	1.001	4.219

$\bar{R}^2$ = .672
S.E. = 0.0735
D.W. = 1.66
Tau = 18

Notes: Tau is the Geary nonparameteric statistic to test for general unspecified serial correlation.

Table 2: Co-integration Regressions

	DF	ADF	DW
RGDP = f(K)	3.84*	4.02*	2.18
RGDP = f(SL)**	3.90*	4.37*	2.30
K = f(SL)	2.12	3.00	.17

* significant at the 5 percent level
** SL denotes skilled labor

Appendix A. Sudan: Gross Domestic Investment and Labor Force

Real Gross Domestic Investment (Private and Public) (% of RGDP; 1985 prices)

1960	1.43
1961	1.85
1962	2.13
1963	1.90
1964	1.81
1965	1.72
1966	1.91
1967	1.77
1968	1.64
1969	1.31
1970	1.62
1971	1.36
1972	1.10
1973	1.45
1974	2.41
1975	2.22
1976	3.19
1977	2.25
1978	1.84
1979	1.67
1980	1.71
1981	1.65
1982	2.99
1983	2.02
1984	1.82
1985	0.54
1986	1.68
1987	1.39

Appendix A (continued)

	(A) Skilled Labor	% Skilled Labor	(B) Unskilled Labor	(C) Total Labor Force
1960	.39	3.29	96.71	11.85
1961	.43	3.53	96.47	12.20
1962	.46	3.66	96.34	12.57
1963	.50	3.86	96.14	12.94
1964	.54	4.13	95.87	13.08
1965	.53	3.99	96.01	13.30
1966	.53	3.93	96.07	13.48
1967	.54	3.97	96.03	13.60
1968	.54	3.95	96.05	13.69
1969	.55	4.00	96.00	13.75
1970	.55	3.90	96.10	14.09
1971	.57	3.96	96.04	14.44
1972	.89	5.81	94.19	14.81
1973	.89	5.95	94.05	14.96
1974	.89	5.80	94.20	15.34
1975	.90	5.72	94.28	15.73
1976	.95	5.89	94.11	16.13
1977	.97	5.72	94.28	16.95
1978	.98	5.80	94.20	17.56
1979	.99	5.47	94.53	18.11
1980	1.00	5.35	94.65	18.68
1981	1.06	5.50	94.50	19.28
1982	1.70	8.55	91.45	19.89
1983	1.73	8.43	91.57	20.53
1984	1.76	8.31	91.69	21.17
1985	1.82	8.34	91.66	21.82
1986	1.87	8.32	91.68	22.47
1987	1.97	8.52	91.48	23.13

Source: World Survey of Education (various issues)/UNESCO, and International Financial Statistics Yearbook, IMF, (1990).

Appendix B

We need to show that θ' takes the form:

$$\lim_{x \to \alpha} \frac{f'(x)}{g(x)} = \frac{\infty}{\infty}$$

Let: $f(t) = -\alpha e^{\beta t}$

$$g(t) = \frac{1}{(k - \alpha L e^{\beta \tau})^{\delta}}$$

$$\lim_{t \to \infty} f(t), g(t) = \lim_{t \to \infty} \frac{-\alpha e^{\beta \tau}}{(k - \alpha L e^{\beta \tau})^{\delta}} = \frac{\infty}{\infty}$$

Apply L'Hôpital's rule:

$$= \lim_{\tau \to \infty} \frac{-\alpha \beta e^{\beta \tau}}{\delta (k - \alpha L e^{\beta \tau})^{\delta - 1} \cdot \alpha L \beta e^{\beta \tau}}$$

$$= \lim_{t \to \infty} \frac{-1}{\delta L (k - \alpha L e^{\beta \tau})^{\delta - 1}} = +\infty \; for \; \beta > 0 \quad \text{and} \quad -\infty \; for \; \beta < 0$$

Note that for: $\beta = 0 \; \lim_{\tau \to \infty} \theta' = itself.$

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Structural and Attitudinal Impediments to Effective Capital Distribution in Saudi Arabia's Islamicizing Economy: Implications for Financial Sector Training

by

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Saudi Arabia's process towards development, and the financial structure employed to finance that process, has created a unique economic system with many distinctive opportunities and problems. Unlike most developing economies in the last two decades, the kingdom has had great financial resources and only modest human resources. This situation has created great pressure to import professional services, especially in the economy's financial sector, with the result that 81 percent of all technical personnel are foreigners (Tawi 1984).

While this is true, a major goal of each Saudi five-year development plan has been the evolution of a domestic human resource pool that would decrease dependency on foreign personnel. Domestically, an elaborate training system educates Saudi bankers in specialties ranging from agricultural economics to corporate finance. By providing consulting services to the kingdom's financial institutions, such agencies as the Saudi Arabian-United States Joint Commission for Economic Cooperation organize training efforts in accounting, asset valuation, audit administration, banking, investment analysis, and risk and return profile writing. Other agencies, such as the Central Procurement and Supply Management Office, the Saudi Consulting House, the Saudi Arabian Monetary Agency, the Ministry of Finance and Economy, and the Saudi Arabian Agricultural Bank, offer specialized training programs in lending and financial services to clients and employees (Presley 1992).

A key component to curricula planning in financial management has been the notion that the kingdom should base its banking structure on an Islamic economics agenda. Moreover, the government has used training forums to experiment with the use of *mudārabah* and *mushārakah* financing programs as a means of further Islam-

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icizing the kingdom's banking structure (currently not allowed for mainstream usage). The government has realized fully that, given current levels of technical and managerial know-how in the Saudi financial system, the practice of interest-free participatory financing in the economy cannot be implemented in a way that ensures optimal resource utilization without first having highly trained personnel in the business sector. No matter how prepared employees in the financial sector may be, borrowers are not currently prepared to operate in an Islamic financial system (Maliki 1991).

These training programs have had mixed results. On the one hand, few development systems have so generously financed infrastructure and major industrial construction. The number of operational factories rose 154 percent, with the number of industrial permits issued increasing 330 percent during 1975-85. By 1987, 2,016 factories had been constructed and had enough production capacity to meet at least 70 percent of market demand. The average annual rate of real output grew by 16.6 percent in the producing sectors, 14.1 percent in the service sector, and 4.8 percent in the oil sector. This can be compared to the average gross domestic product (GDP) growth rates of 2.9 percent in the United States and 2.7 percent in West Germany. [1]

On the other hand, the structure of the Saudi financial sector tends to undermine attempts at efficient risk management and portfolio diversification, forcing the kingdom's banks to carry levels of risk beyond those suggested by Islamic mandates. As this research points out, the risk carried by banks would be increased if *mudārabah* and *mushārakah* financing were to come into mainstream usage. Furthermore, as Uppal (1992) correctly points out, the cost of financing would rise for the borrower. Other writers, including Shahid, have proven theoretically that the returns to lenders would increase with the use of Islamic financial instruments. This may be true, but the reverse side is that the lender will have to increase its exposure to risk. It could be argued that the business community assumes far less risk in the development process than do government-sponsored banks and financiers, a situation likely to increase if the issue of participatory financial instruments becomes the norm. Consequentially, given the structure of banking in Saudi Arabia, the government's commitment to promote Islamic financial practices force its banks, almost by default, to bear most of the risk in lending through public sector banks.

The crux of the problem is the absence of trained personnel in the business and financial sectors who can produce profit profiles for firms and the absence of a structure that can guarantee consistency and conformity in business practices (Wright 1979-82). This paper will investigate some of the conditions that support this assertion: 1) structural developments in the Saudi economy make risk and return profiles exceedingly difficult to establish; 2) popular attitudes towards participatory financial instruments impede capital distribution efforts directed at the private sector; and 3) a lack of managerial sophistication in small manufacturing firms has con-

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[1]These statistics come from various Saudi government reports and are discussed in Presley and Westaway (1989).

strained business development. Solutions to these problems may be sought through the development of a new training curricula and nationally accepted accounting standards by the kingdom's financial institutions.

Economic Structure and Monetary Risk

Economic planners in Saudi Arabia have always thought it important to develop economic structures based on pure Islamic models that are free from the secular regulations often imposed by western models of development. This is particularly true in the financial sector, which has been careful to honor the Prophet's mandates against *ribā* (usury) and strives for the fair distribution of risk according to the Shari'ah. Under a completely Islamic model, the banking system would therefore be based on two major forms of Islamic finance: *mushārakah*, where both the financier and the borrower participate in a joint venture contract that includes an agreement to split the looses and profits in proportion to the amount invested, and *mudārabah*, where one party provides capital for a business project and a second party provides entrepreneurial and managerial skills. In the latter case, profits are also shared according to a proportional contract. In the case of bankruptcy, however, the *mudārib* (entrepreneur) is absolved of financial responsibility, because his effort and time will not be remunerated. Islamic councils favor these methods because they have no high up-front borrowing costs and do not guarantee a return to either party. Saudi Arabian banks currently use an interest-free capital distribution system and are experimenting with the use of equity-based financing.

As mentioned earlier, however, experiments attempting to support interest-free forms of finance have only been partially successful. The citizens of Saudi Arabia have seen more money spent in the modernization process than any other community in the world. But Saudi banks may have been overly generous in interpreting their responsibilities, a policy that may have forced them to accept loan portfolios that were far riskier than necessary. In addition, the banks' liberal lending policies have casued them to behave more like capital venture financiers than traditional banks. A key example of this type of lending behavior is found in the Saudi Arabian Agricultural Bank. In this institution, loans are not based on business plans or on written risk and return profiles; funds are distributed according to the project's priority in the kingdom's five-year development plan (ibid.). Such liberal aid, grant, and loan policies have created an economic structure in which the business community controls the capital distribution process.

The fact that attempts at risk management in Saudi banking portfolios had failed became apparent in the mid-1980s, when declining oil prices forced government spending into retrenchment. This, in turn, revealed the business community's confusion over cash flow management. Many business owners did not make a distinction between government-sponsored aid and loan receipts and cash flows provided by sales (al Hajjar and Presley 1992). As government subsidies declined, inefficient

businesses dependent on government disbursements for survival began to default on their loans. The problem became so serious in 1988 that the Real Estate Development fund offered 20 percent discounts for the timely repayment of loans and an additional 10 percent discount if repayments were made in a lump sum (Presley and Westaway 1989). By 1990, however, the system seemed to have recovered, and default rates and late payments have been reduced to acceptable levels.

Instead of promoting dependence on private sector profits, a stated priority in each five-year development plan, aid and subsidy programs may have stifled demand-based entrepreneurship and may have created disincentives for profit-generated circulating capital (Wright 1992). These disincentives arise from several sources: the government's crucial role in the acquisition and distribution of production resources; the fact that the government is the country's largest consumer; the government's policy bias towards distributing funds to real estate projects; and because capital circulation in Saudi Arabia involves the lending of financial resources and the borrowing of human and natural resources (al Hajjar and Presley 1992). Fifty-four percent of consumption is achieved through direct government spending, and up to 75 percent of private sector spending is supported by government-financed assistance as well as by grant, loan, or subsidy programs (Presley and Westaway 1989). In 1982, fifty-six countries had joint venture projects in Saudi Arabia; forty-one of these were contracts with the government. The service sector accounts for 66 percent of the country's gross domestic product, 38 percent of which comes from services provided to the government (Kurashi 1990). Seventy-three percent of employment in the indigenous work force is in the service sector (Shaw and Long 1989). As oil revenues declined in the late 1980s, negatively effecting real estate values, the government responded by increasing the percentage of total gov-ernment credit disbursements to real estate-intensive industries from 64 percent to 84 percent (Presley and Westaway 1989). In 1985, as well, possibly 80 percent of all industrial laborers in the Saudi economy were foreign.[2] According to Wilson and Yousef, the system has "a bias towards capital intensity" (Wilson 1983) and is based on a model in which "imported technology is the product of an alien imagination" (Yousef 1988).

This lending-borrowing relationship has been facilitated by the government's policies toward quasi-centralized procurement planning. While the intention of such policies is to keep industrial input costs low, the private sector has become inordinately attached to government funding as a source of investment cash flow and to government purchasing agents as a source of sales. The net effect of such policies is an economy in which business revenues and asset values are lined more closely

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[2]Population estimates vary widely, especially with respect to imported labor. Shaw and Long (1989) estimate that 80 percent of the labor is imported, while Saudi government documents put the estimate as low as 40 percent. Typically, estimates range between 60 and 80 percent.

to aid and grant programs than to corporate efficiency. Such a situation emphasizes the nature of risk and return in bank asset structures. Indeed: How can lending institutions create risk and return profiles if cash flows from subsidies are meant to keep inefficient businesses from failing? How can they distribute capital venture funds if businesses cannot prove the generation of nongovernment linked profits? Likewise, without the threat of foreclosure, the banking system becomes responsible for the debt of failing businesses. This situation puts the Saudi banking structure in an unexpected and unfortunate situation: it must assume most, if not all, of the kingdom's private sector risk. To date, oil revenues have made this assumption of losses feasible, but it is a burden that the government and the banks may not be able to afford indefinitely.

Attitudinal Factors Affecting Risk Management

While major industrial concerns seem to have taken advantage of development financing plans, small manufacturers have not. This is surprising, given the apparent leniency afforded by loan officers. Nevertheless, only 31 percent of all businesses receiving government-backed financing employed less than thirty people, although census reports indicate that over 91 percent of businesses employed less than ten persons (al Hajjar and Presley 1992).

It is clear that the small business sector is not making use of the kingdom's commercial lending opportunities, and that a serious finance gap has developed as a result. One solution to this problem might be the introduction of *mudārabah* and *mushārakah* financing programs. However, previous attempts in this direction have failed. It should be mentioned here that we do not intend to point out the weaknesses of *mudārabah* and *mushārakah* financing contracts, nor are we trying to say that there is any inherent weakness in the capital distribution systems found in Islamic economic agendas. Rather, we are trying to find out why Arab Muslims are not willing to participate in the Islamic banking process. In the case of Saudi Arabia, specifically, the reasons for this should be sought in the negative attitudes of business owners toward participative forms of financing and in their management attitudes towards management practices required for commercial sector financing.

In papers presented at the 1991 British Society of Middle Eastern Studies Conference (London) and at the 1991 International Conference on Islamic Economics (Kuala Lumpar), al Hajjar and Presley (1992) revealed an interesting phenomenon within Saudi Arabia's small business community. In their studies, questionnaires designed to identify private sector attitudes towards *mushārakah* and *mudārabah* financing were collected from 222 small firms within Saudi Arabia's manufacturing sector (53 percent of the questionnaires distributed were returned). The second part tried to identify the level of "managerial sophistication" in generating the types of financial data needed for banks to conduct appropriate risk and return analysis. Follow-up interviews were made to verify findings based on empirical data. Results

showed that a majority of small manufacturing businesses owners were either not willing or not able to accept participative financing. One might assume that the perceived abundance of financial capital in the Saudi public sector seems to be a source of the problem or that it compounds the problem. Surely, many people expect to be carried in a system ruled by such a rich government. But the real reason goes much deeper than this: first of all, their basis is found in cultural values and the wish to work in family-owned businesses and, secondly, the existence of ineffective financial managerial skills among the owners of small, usually family-owned, businesses in the private sector.

Eighty-three percent of the respondents rejected the possibility of a shared financing arrangement, and only 16 percent said that they would be willing to accept it. Various explanations exist for this phenomenon. One is sociocultural. As Cantori (1986) points out, correctly, Middle Eastern political and economic systems are derived from a corporatist model that revolves around endogenous family relationships. This often makes business leaders more concerned with the businesses support of the family than with secular profits. Researchers have found that this culturally-based attachment to the family-owned business remains a factor for Arab families even after they have emigrated from the Arab world (al Hajjar and Presley 1992). Of the respondents, 36 percent were more prepared to share business ownership with a friend or relative than with a financial institution or a national company. Of those rejecting *mushārakah* finance, the overwhelming majority (nearly 90 percent) did so in order to remain the sole owner of the business so that they could hand it over to a family member at a later date. In contrast, only 13 percent indicated that they would prefer to share ownership with a commercial bank. In the six manufacturing sectors considered, rejection of *mushārakah* neither fell below 80 percent nor rose above 87.5 percent, reflecting little vectorial variation in attitude. Once again, family considerations were the major concern. Others expressed concern that a new partner might assume too much control.

The *mudārabah* form of finance was only slightly more popular: 78 percent of respondents reported that they were unwilling to borrow in this fashion. Approximately two-thirds expressed a fear that the financier would eventually take over the business, while another 30 percent indicated that their reluctance was due to a fear of management interference.

The surveys also indicated an unwillingness on the part of business owners to maintain separate documentation for personal and business transactions. Interviews confirmed that another reason business owners preferred to do business with family and friends was due to the simplicity and informality that might be attached to such a financier. Moreover, less than 20 percent of the firms studied had been established on the basis of a feasibility study; less than one-third kept financial records; less than one-fifth prepared annual budgets; and almost one-third did not keep a bank account exclusively in the name of the business. Business plans were not used because insufficient information was available. The main reason for the absence of accounting records in small businesses is management's failure to understand accounting's role

in the decision-making process and in obtaining institutional credits. In sum, "the typical small manufacturing business is not able to assess the level of assets or its liabilities, cannot determine whether it is solvent, cannot determine the distribution of profits, nor ascertain how cash has been raised or used" (Schmidt 1993).

Taken together, these attitudes of private sector managers put lending officers in a very difficult situation. For banks and lending institutions to fill the small business finance gap, they must, in an Islamic economy, make participatory loans. This requires that risk and return profiles be written on a capital venture model, an arrangement in which the financier often retains a substantial amount of executive control. To encourage business sector participation, lenders are required by the business community to give up this level of influence. If we add the fact that loans need not be repaid if the borrower uses religion as an excuse for his unwillingness or inability to repay, we see a system in which the government of Saudi Arabia, as well as the lending institutions representing it, assumes an inordinate amount of risk while the the borrowing business community assumes little or no risk. We also see that financing costs and risk levels would rise significantly if the strictest forms of *mudārabah* and *mushārakah* financial instruments were in common use. To be sure, this is an unexpected consequence of Saudi Arabia's generous economic development plans, but, at the same time, it is a very real consequence.

Conclusions

In essence, the crux of the problems faced by Islamic banks in the Saudi system is the absence or lack of trained personnel in the small business and the financial sectors. The problems faced by banks when lending to the former sector are exacerbated by the fact that the use of consistent accounting standards has not been legislated and by the inability of the court system's commercial branch to establish and implement bankruptcy laws. In each case, the planned implementation of Islamic mandates in economics and jurisprudence does not ensure the availability of appropriately trained accountants, judges, lawyers, and managers. There is as much truth to this statement for a capital-rich Muslim state like Saudi Arabia as there is for a capital-poor Muslim state like Pakistan. Wright (1993) has even argued that the problems faced by Islamic banks and foreign-styled indigenous commercial banks are essentially the same in developing Muslim-Arab countries. One could surmise that the economic systems in many Muslim-Arab economies are so heavily biased against the lender that financial capital is virtually cost-free to the individual buyer and, ultimately, costly to society at large. We are not trying to prove this here, although we do plan to address the idea in future research. In this paper, which has focused on the role of human resource mobilization, the question becomes one of how the attitudinal and structural inefficiencies in Saudi Arabia's business management community can be changed and redirected in a way that will allow its Islamic banks to operate on an risk-efficient basis.

The recommendations that arise to answer this question are more evident to the training specialist than to anyone else. In reality, the ability to evaluate loans for the purposes of capital distribution relies on several factors: the adoption of an economic system in which managerial efficiency is the determining factor of a business' success and, therefore, the determinant of the increasing (or decreasing) value of the company; the requirement that businesses provide a consistent record of earnings; the provision for a consistent format for reporting asset values; and the development of laws providing for foreclosure at early liquidation. To meet these challenges, a new direction should be charted in the kingdom's risk management curriculum: it should focus on educating borrowers in addition to training lenders. Economic literature written by western analysts tends to blame Islamic financial institutions when reserve deficiencies and capital shortages occur. As a result, the influence of the borrowing community in the lending process is usually neglected. The blame for a small business finance gap cannot be shouldered by banks, even in a capital-rich economy like that of Saudi Arabia, for the solution to this problem is multidimensional: the development of better training programs in the banking system, the marketplace, and the halls of government. The implementation of change in these areas will be best served in the following ways:

1. The attitudes of the business community towards Islamic forms of finance must be changed through education and training;

2. Muslim financiers must be able to write risk and return profiles that provide a more accurate reflection of cash flow from profits as opposed to government subsidies. This also means that lending officers must be made fully aware of their role as capital venture examiners;

3. National accounting and reporting standards need to be developed so that borrowers can provide appropriate and consistent financial data; and

4. A privatization process that decreases the private sector's reliance on government consumption should be pursued.

At each point in this process, the common denominator is training and the transfer of a permanent and indigenous managerial force, consisting of persons willing to become long-term members of accounting, auditing, banking, and political establishments, into the financial sector. This reminds us that the need for a skilled labor force must be combined with the management of geographical, social, and demographic factors to make economic progress possible. As this skilled labor force develops in the financial sector, business activity will stabilize, government policies will become more defined, and financial markets will become more efficient. Only then will Saudi Arabia's Islamic banks share equitably in the private sector's development risk instead of bearing the brunt of its managerial inefficiencies.

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Human Capital, Government Policies, and Economic Growth: Some Evidence for Muslim Countries

by
Abdelhameed Bashir and Ali F. Darrat

Introduction

The neoclassical growth model of Solow (1956) and Denison (1961) postulates that investment in physical capital (technology) is the engine of economic growth. According to this approach, growth rates across different economies should converge on steady-state values. However, such a prediction has received little confirmation from the available empirical evidence. This neoclassical model further predicts that the initial capital-labor ratio has no effect on steady-state growth, and thus poor countries with lower capital-labor ratios (or lower output) should grow more rapidly than developed ones. The experience of recent decades has not confirmed this prediction either. Observed heterogeneous growth rates in recent years have been provided by the experience of the "growth miracles" of some Asian economies, which averaged 6 percent per year in the period 1950-80, compared to less than 2 percent average for poorer countries in the same period (Lucas 1988). In addition, there seems to be a persistent variance in growth rates even among industrialized countries. With its restrictive assumption regarding the dominant role of technology, the neoclassical model appears unable to explain this observed diversity of experience.

One major criticism of this neoclassical "exogenous" growth model is that the diminishing return to capital limits the role of saving and investment. An increase in investment, for example, promotes temporarily the growth of capital stock and output. But as capital stock grows, the return to capital falls. Another problem with this theory is its neglect of any link between population growth and the rate of economic development. This assumption of exogenous population growth does not consider fully human capital as an engine of growth, although recent studies have revealed a close association between human capital and economic growth (Barro 1989;

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1991). Nor did the neoclassical model assign any role to government policies in the growth process, despite the potential positive role that government policy may play in education, training, and improving public services.

The following sections will: a) outline an alternative *endogenous* growth model; b) construct the variables and analyze a number of testable implications derived from recent growth literature; c) report and discuss the data and empirical findings; and d) offer concluding remarks.

A Theory of Endogenous Growth

An alternative approach for studying economic growth is to view it as an endogenous process of several internal factors. As Romer (1986), Lucas (1988), and others have observed, an economy can achieve growth through internal factors, as in the case when production technology may exhibit increasing returns in reproducible factors. These factors include, among others, human capital (effective human resources), population growth, and government policy.[1] Apart from allowing a greater role for policy in determining growth, modern theories of growth have also removed the constraint of diminishing marginal returns to capital.

The shift of emphasis from exogenous technical innovation to endogenous factors as catalysts for growth is a major theme of recent economic development literature. The distinct role of human capital is justified by the assumption that knowledge (the embodied form of human capital) is valuable not just for the production of goods, but, perhaps even more so, for the production of innovative knowledge, the advancement of technology, and the improvement of productivity. This suggests a close association between growth and human capital. Experience has shown that countries that invest more in education usually achieve a higher per capita income for their citizens. Meanwhile, it is widely argued in endogenous growth literature that rates of return on human capital tend to be higher in developed countries, where jobs in technical fields require more advanced educational levels.[2]

The important role of population in the endogenous growth model rests on the fact that it interacts closely with both the level and the growth rate of output, as well as with the investment in human capital. As Tamura (1988) has argued, the fertility of the present generation increases the discounted per capita future consumption and, hence, discourages investment in both human and physical capital. More generally, factors that may lead to higher population growth (i.e., the decreasing cost of raising children) tend to reduce the growth of per capita income. Thus there seems to be a systematic relationship between declining fertility rates and per capita income growth, especially during economic prosperity (Baker and Murphy 1990). Rosen-

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[1]See Rebelo (1990), Rozenweig (1990), and the literature cited therein for further details.

[2]This probably explains one reason for the brain drain from poor to rich countries.

zweig (1990) has also argued that high-income countries are characterized by low fertility and high levels of human capital, whereas low-income countries are characterized by high fertility and low levels of human capital.

In recent growth literature, government policy is shown to play a key role in determining economic activity. It is often argued that private markets may fail to produce the required public assets (Barro 1989), thus necessitating certain fiscal actions designed to create incentives for saving and investment. This is particularly true in cases where there are well-functioning capital markets in which entrepreneurial assets can be exchanged in order to induce technological innovation. Governments may also provide the appropriate institutions and infrastructures needed for growth. The positive association between economic growth and government spending is based on the assumption that the private and the public (i.e., government) sectors are complemen-tary rather than substitutable.[3]

Government policies may also create barriers to growth, as suggested by Landau (1983, 1986), Marsden (1983), and Darrat and Conte (1988). In particular, ambiguity exists as to the size of the public sector needed for promoting economic growth. Supply-side theories argue that higher taxes (needed to support government spending) may distort incentives and thus hamper investment and output. Moreover, excessive government spending results in large budget deficits that require huge borrowing and/or escalating monetary expansions. Borrowing leads, typically, to higher interest rates along with domestic and foreign debt problems that, in turn, crowd out private investment. Monetary expansions are usually followed by inflation, currency appreciation, and the loss of world market shares. According to supply-side economics, therefore, countries with large government spending (and high taxes) will experience lower growth. In other words, government policy has adverse effects on growth.

Furthermore, recent studies have shown that political and military disruptions may have important economic consequences for developing countries. An effective news media and the freedom of expression could enhance the checks and balances applied to government policies and thus encourage domestic reforms. Conversely, civil war and political instability could severely hamper a given country's economic development.[4] However, some countries known for their oppressive political regimes have not experienced depressed economic conditions, perhaps because of the illusion of stability, at least in the short run. Clearly then, the effect of civil liberty on economic growth appears to be largely an empirical issue.

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[3]Of course, as the government's impact upon the economy may not be represented completely by the size of government spending, the latter is taken here only as a proxy. Other important and relevant issues are those related to the composition of government spending, the impact of regulation, and the problem of distortion.

[4]The recent famine in many African countries was caused primarily by military conflict and not by poverty or inadequate agricultural resources.

A formal theoretical basis of the preceding discussion can be outlined as follows. Consider an economy with identical, infinitely-lived individuals whose objective is to maximize the utility function U(·) given by:

$$Max_{c_t,g_t} \quad e^{-\rho\tau}\, U(c_t\,,\, g_t)\, dt \qquad , \rho > 0 \tag{1}$$

where c_t represents commodity consumption in period t, g_t represents the flow of public good (supplied by the government) in period t, and $\rho > 0$ is the constant rate of time preference.[5] The infinite horizon can be interpreted as the forward-looking behavior of an altruistic society in which the present generation cares for the future generations which, in turn, are concerned for their offspring. U(·) is assumed to be strictly concave and twice continuously differentiable, satisfying the usual Inada conditions. A specific form of the utility function can be written as:[6]

$$U(c_t\,,\, g_t) = \ln\, c_t + \ln\, g_t \tag{2}$$

We further assume that there is only one final good in the economy produced with constant return-to-scale technology, as given by:

$$y_t = f\,(h_t\,,\, g_t) \tag{3}$$

where y_t represents output, h_t denotes the amount of human capital (i.e., schooling) as a production input, and g_t represents the quantity of public services available to each producer.[7] Note also that the production process can be undertaken by a profit-maximizing firm or by a household. In addition, we assume that these services are provided without user charge and free of externalities. The production function f(·) is assumed to be concave and twice continuously differentiable. In particular, we specify a Cobb-Douglas production function of the form (see Barro 1989):

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[5]We assume that the government purchases output from the private sector and makes it available free of charge to households. These purchased services, as will be seen below, provide inputs for private production. For a similar treatment, see Barro (1990).

[6]For a similar, but discrete, analysis, see King et al. (1988). This form of utility function is chosen to insure that the steady-state solution is compatible with equilibrium. The intertemporal elasticity of substitution is invariant to the scale of consumption and thus guarantees that the utility is bounded.

[7]The role of public service as an input in private production links government policy and growth.

$$y_t = Ah_t^{1-\alpha} g_t^{\alpha} \qquad , 0 < \alpha < 1 \tag{4}$$

where A > 0 is a shift parameter for production technology. Output y_t is divided between consumption c_t, government purchases g_t, and investment in human capital, $\dot{h}$. To exclude the free-rider problem associated with the consumption of the public good, we assume the government levies taxes to finance its purchases. If the tax rate is r, then to produce g_t and exhibit a balanced budget, the government must set:

$$g_t = T = ry_t \tag{5}$$

where T is the government tax revenue. Substituting equation (5) in (4) insures that production has constant returns to human capital. Given the above formulations and the fact that some of the resources would be used to produce g_t, the material balance equation is given by:

$$c_t + \dot{h} = (1 - r) f (h_t , g_t) \tag{6}$$

Solving the above system of equations, the per capital steady-state growth rates of output, consumption, and human capital are all equal to:[8]

$$\upsilon = \left\{ \left[(1 - r) A^{\frac{1}{1-\alpha}} r^{\frac{\alpha}{1-\alpha}} \right] - \rho \right\} \tag{7}$$

We assume that certain restrictions are satisfied if the system possesses a steady-state growth. These restrictions are such that given A and α, r would be chosen so as to make the bracket in equation (7) larger than ρ, resulting in $\upsilon > 0$. As apparent from the above equation, given α, the optimal growth rate is a function of the government tax rate (r) and the technology factor (A). With a given share of human capital $(1 - \alpha)$ in the production process, the optimal (growth maximizing) tax rate suggests that government expenditures would promote growth as long as r is less than α. Equation (7) also suggests that the only way to achieve higher growth in output is to have a greater rate of technological advancement (A), something presumed to be outside the control of the agents in the economy.

Using data over the period 1960-85, we will test the preceding implications of our endogenous growth model. In particular, we will investigate empirically the growth experience of thirty-two Muslim countries that are members of the Organiza-

[8]Formal derivation of the above growth equation is relegated to a mathematical appendix that is available from the authors upon request.

tion of the Islamic Conference (OIC).[9] These countries were selected based on the fact that the bulk of the empirical evidence found in endogenous growth literature is drawn from data that ignore regional and economic diversities. There are few, if any, studies on less-developed countries. In addition, these OIC countries exhibit considerable disparities in their rates of growth. This paper will test the hypothesis that the reason for such disparities may lie in different government policies, in addition to different stocks and accumulations of human capital.

Construction of the Variables and the Testable Implications

Real economic growth, as an endogenous variable, is represented by the growth rate of per capita real GDP. We used two alternative proxies for human capital: the rate of primary school enrollment and the literacy ratio. The primary school enrollment rate (HC) measures the percentage of those enrolled relative to their age group.[10] The literacy rate (LT) measures adult literacy in 1960. The endogenous growth model predicts that countries with high rates of initial stock as regards human capital should grow faster. By strengthening the population's creativity and its ability to innovate, education enhances productivity and promotes higher economic growth.

The proxy for government policy (GP) is used to test the hypothesis that attributes diversity in cross-country growth rates to differences in government policies (Rebelo 1990). This variable is measured by government spending (net of defense and education) as a percent of GDP. The starting (initial endowment) level of per capita GDP (IX) is used to test the neoclassical assumption that the starting level of per capita output has no effect on steady-state economic growth. In the transition to steady state, however, countries with a lower output per capita are expected to grow faster (Kormendi and Meguire 1985). Recent studies (Barro 1991) found a negative relationship between growth and the starting level of per capita GDP. The starting GDP is measured in US 1980 dollars for each country in the sample. We also use the rate of growth of population (NG) to test the role of population in the growth process. The neoclassical growth model predicts that if all countries are in the steady state, there should be a strong effect of population growth on the GDP's growth, with a unitary elasticity.

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[9]The OIC is a regional organization working towards "strengthening economic, social, and cultural ties between the Islamic countries." The OIC countries included in the sample are Afghanistan, Algeria, Bangladesh, Burkina Faso, Cameroon, Chad, Egypt, Gabon, Gambia, Guinea, Guinea Bissau, Indonesia, Iran, Iraq, Jordan, Kuwait, Mali, Malaysia, Mauritania, Morocco, Niger, Nigeria, Pakistan, Saudi Arabia, Senegal, Sierra Leone, Somalia, Sudan, Syria, Tunisia, Turkey, and Uganda.

[10]In a preliminary analysis, we also used the secondary school enrollment rate. However, this proxy was dropped due to its relatively poor statistical performance.

We further extend our analysis to address such other determinants of growth as openness to international trade, political stability, and civil liberty. Recent integration in world trade and global technology have become critical factors for growth. Openness (the ratio of exports plus imports to GDP) is used as a proxy for the degree of integration into the world economy.[11] Trade restrictions are typically expected to have deleterious effects on growth due to the related failure to exploit comparative advantages. Thus the economic openness proxy (OP) should have a positive effect on growth and investment.

Political instability (RV), measured by the number of revolutions plus military coups per year, is expected to have a negative effect on growth. Civil liberty (CL) relates to freedom of expression in the news media. This variable is measured on a scale from 1 to 7, with 1 offering the highest level and 7 the lowest.[12] Countries with good records in the area of civil liberty are expected to experience higher growth. We also use two dummy variables: (OD) and (FD). The first dummy variable (OD) represents the impact of oil-rich resources on the economy. If the country produces oil, its value is 1. If the country does not produce oil, its value is 0. The (FD) dummy gauges the impact of drought and poverty. It has a value of 1 if the country is in sub-Sahara Africa, and a value of 0 if it is not.

These hypotheses drawn from the literature are by no means exhaustive. Nonetheless, they could explain the diversity in the growth rates of these countries. As mentioned earlier, we used a sample of thirty-two OIC countries, the largest set of countries for which we were able to compile reliable data series for the variables under investigation. The data were obtained from different sources, the most important of which were Barro (1991) and the Penn World Table (Mark 5) prepared by Summers and Heston (1991).[13] We also used some data from various issues of the *World Development Report* (1987, 1990, 1991). For the school enrollment series, we used the *World Table* (1980). Data on civil liberties are from Gastil (1987).

Empirical Results

The empirical results from regressing per capita real GDP growth on the set of variables proposed in the previous section are reported in Table 1. The results reveal a negative and highly significant relationship between growth and the initial level of GDP, a finding consistent with Barro (1991), although it is contrary to the predictions of neoclassical theory. The coefficient of IX is -0.001 with a t-value of -20.39,

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[11] Of course, in addition to policy actions, country size can influence the trade/GDP ratio.

[12] See Gastil (1987) for a similar measure.

[13] We wish to thank R. J. Barro and the NBER for providing us with the necessary data.

Table 1: Regression Estimates of the Real Economic Growth Model

	Equation 1	Equation 2	Equation 3	Equation 4	Equation 5	Equation 6	Equation 7
	Coefficient (t-value)	Coefficient (t-value)	Coefficient (t-value)	Coefficient (t-value)	Coefficient (t-value)	Coefficient (t-value)	Coefficient (t-value)
Intercept	0.014 (1.22)	0.016 (1.07)	0.013 (1.25)	0.009 (0.35)	0.020 (1.72)	0.010 (0.44)	0.010 (0.50)
IX	-0.001 (-20.39)	-0.001 (-8.87)	-0.001 (-17.88)	-0.001 (-6.49)	-0.001 (-21.09)	-0.001 (-5.88)	-0.001 (-20.35)
HC	0.039 (4.31)	0.039 (5.09)	0.039 (4.04)				
LT				0.086 (3.23)	0.087 (3.54)	0.082 (2.81)	0.091 (3.44)
GP	-0.049 (-1.09)	-0.032 (-0.93)	-0.049 (-1.11)	-0.057 (-1.09)	-0.047 (-1.02)	-0.056 (-1.10)	-0.045 (-1.09)
FD	-0.006 (-1.03)	-0.007 (-1.27)	-0.006 (-0.97)	-0.002 (-0.09)	-0.002 (-0.28)	-0.002 (-0.22)	-0.002 (-0.22)
RV		-0.022 (-2.13)			-0.023 (-2.58)		-0.024 (-2.80)
NG		0.017 (0.04)		0.228 (0.37)		0.093 (0.15)	
CL							0.001 (0.55)
OP			0.001 (0.05)			0.008 (0.55)	0.005 (0.37)
R^2	0.69	0.73	0.69	0.66	0.70	0.66	0.71
SEE	0.01537	0.01496	0.01566	0.01642	0.01533	0.01665	0.01586
DW	2.30	2.30	2.30	2.25	2.20	2.26	2.15
Tau	18	18	18	18	18	18	18
HT	1.02	0.51	0.80	1.16	0.79	1.22	1.07

Notes: Tau is the Geary nonparametric statistic to test for a general (unspecified) type of autocorrelation. HT is the Park-Glejser F-statistic to test for heteroscedasticity. The dependent variable for all seven equations above is defined as the growth rate of per capita real GDP (average for 1960-85) for the OIC group of thirty-two Muslim countries. The independent variables are as follows: IX = 1960 per capita Real GDP; HC = measure of human capital; LT = adult literacy rate; GP = proxy for government policy; FD = dummy variable for taking the value of unity for sub-Saharan African countries, and zero otherwise; RV = average number of revolutions (political instability); NG = population growth; CL = measure of civil liberty; and OP = measure of economic openness defined as the ratio of the trade account to GDP.

indicating that if the starting per capita real GDP increases by, for example, $1,000, the rate of real growth of the economy would decline by 0.1 percent. This suggests that countries endowed with low levels of per capita real GDP can grow faster than countries endowed with higher levels. The proxy for human capital (HC) has a positive and significant effect, which implies the presence of a strong positive link between investment in human capital and growth.

These two findings suggest that an increase in the starting per capita real GDP that is accompanied by higher investment in human capital may offset each other and thus become unable to stimulate growth. The result is particularly consistent with the experience of the oil-based economies (eight such countries are included in the sample), where the initial levels of per capita real GDP are high and the rates of enrollment in schools are comparatively low. On the other hand, most of the sub-Saharan African countries are characterized by having initial levels of GDP that are relatively higher than those of their school enrollment rates.

Regression 2 adds the political instability variable (RV). As the theory predicts, RV has a negative and significant effect on growth. A reasonable interpretation is that as governments (particularly in Africa) are confronted with revolutions and military coups, economic plans are usually disrupted, and countries are then forced into vicious circles and backward economic processes. The other two variables in regression 2 represent government policy (GP) and the dummy variable for sub-Sahara Africa (FD). Both variables, as expected, have negative effects on growth, but neither is statistically significant. Interestingly, when we run the regression without the RV variable in regression 3, the GP variable displays a larger negative magnitude towards growth with a larger t-value. One possible explanation for this is that insecure governments spend more resources to stabilize the regime than to promote output and, hence, growth. However, the negative effect of GP on growth supports the supply-side hypothesis that taxes needed to finance higher government spending distort resource allocation and weaken incentives, thereby hampering economic growth.

Population growth (NG) is added as an explanatory variable in regression 4. Although statistically insignificant, NG has a positive sign contradicting recent findings on the relationship between fertility and economic growth. It is important to note here that having large families is part of these countries' culture. Moreover, the coefficient on NG is significantly less than one, confirming the neoclassical assumption that, during the transition to the steady state, the effect of NG on growth may be less than one-to-one if either capital accumulation or labor force growth does not keep pace with population growth. As for the role of economic openness (OP), regression 3 reveals that it has the expected positive effect, although it is highly insignificant.

Also in regression 4, we use the adult literacy rate (LT) instead of school enrollment as a proxy for human capital,[14] and drop the instability (RV) and the openness (OP) variables. The LT variable is related positively to growth and highly significant, which supports previous results. Barro (1991) has argued that the school enrollment ratio may represent the flow of investment in human capital rather than the initial stock. Thus the LT variable appears to be a better proxy for the initial stock of human capital. Regression 5 adds RV, while regression 6 drops RV and adds OP and NG. Both have the same effects, with slight changes in their respective t-values. Finally, regression 7 includes all proposed variables without altering the results. The civil liberty proxy (CL) is also included in regression 7, which displays the correct positive sign, although it is statistically insignificant.

Concluding Remarks

The empirical analysis in this paper used both endogenous reproducible factors and market-related growth variables. In light of the well-known shortcomings of data from developing countries, sufficient care should be exercised in interpreting the results, which should only be taken as suggestive. At the very least, though, our results suggest some support for many of the recent findings in endogenous growth literature. The diversities in the rates of growth between the OIC countries seems to be explained primarily by two factors: the start-of-the-period level of per capita real GDP and the start-of-the-period stock of human capital. Moreover, the data reveal a negative association between government policy and economic growth across the countries examined. However, the evidence is not sufficiently strong to accept the predictions of supply-side economics regarding the detrimental effects of government spending and taxes. Political instability, as expected, has significant deleterious effects on growth and seems to be a major factor in the persistent variance in growth rates. Oil appears as an important stimulating factor of growth, although only marginally, since the variable proves statistically insignificant. Finally, although the results are consistent with recent findings, a great deal still remains to be explained, particularly in regard to the poor performance of sub-Saharan African countries and the insignificant effects of population growth, civil liberties, and openness to international trade. Of course, possible multicollinearity among the variables of the model may partly account for the insignificant effects found for some of these candidate variables.

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[14]The literacy rate as a proxy for human capital is also employed by Romer (1986) and Barro (1991).

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